Vol 4 No 5

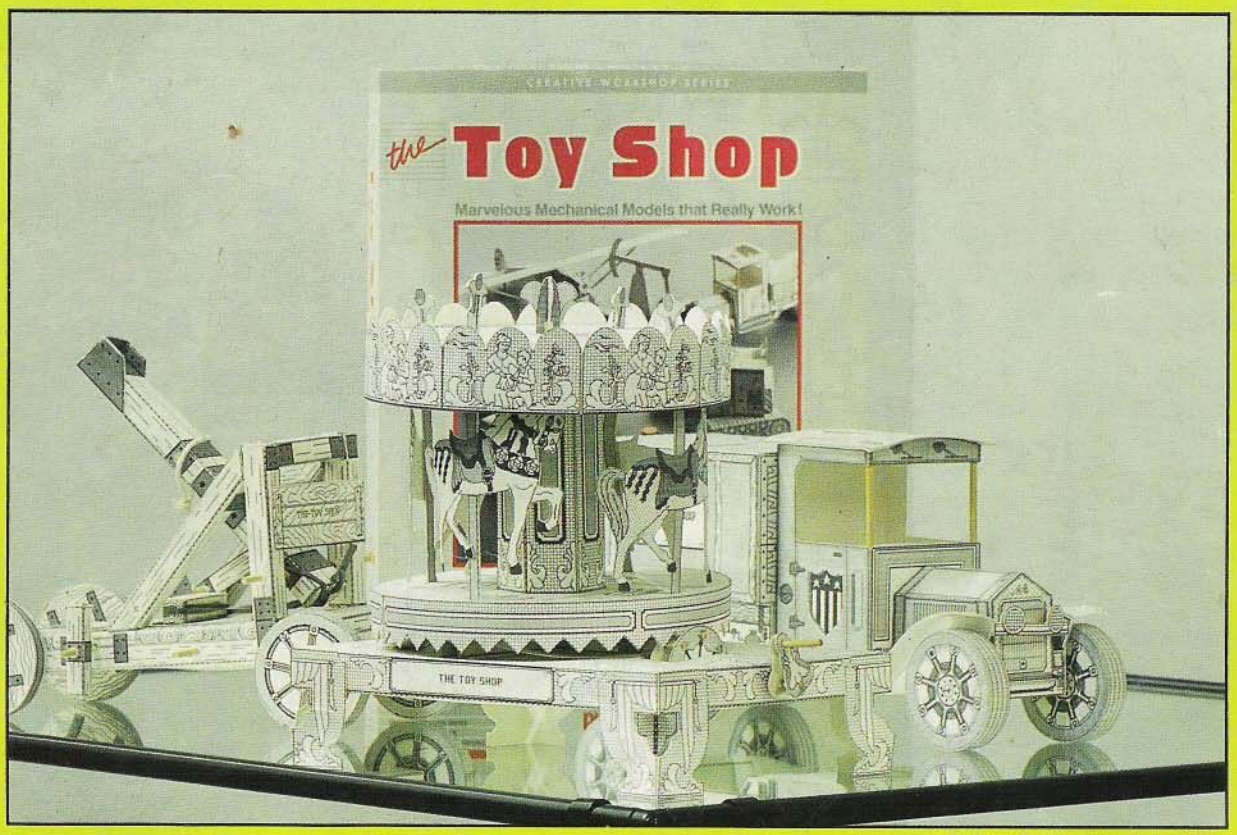
May $3*

The Australian COMMODORE REVIEW

The Independent Australian Magazine

Personal Publishing - reviews of Certificate Maker and Toy Shop

Game of the Month Auf Wiedersehen Monty



Raster Interrupts

C128 Bank Switching

Amiga Column

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BEEMAN MAYRHOFER STOTT/CC422

The Australian Commodore Review

Vol 4 No 5 May

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Editorial

This month has seen a few shifts and shuffles back at Commodore HQ in the good old U S of A. Plainly, we shall not know the true reasons behind the departure of Thomas Rattigan and Nigel Shepherd for some time, suffice to say that Commodore has officially stated that they breached contractual agreements.

Whatever the reasons behind this unexpected upheaval, it appears that all is well, and Irving Gould has been appointed as the new CEO.

Back in Australia, John Laws, the man with more credibility than a washing powder endorsed by the Australian Housewives Association, is busy promoting the new PC5 and PC10.

His authoritative voice will also be heard singing praises for the Amiga a little later in the year.

And does it work? According to several dealers, the crowds are starting to throng toward the stores for another look at the Commodore range in a new, more serious light. It should work, as the price for a PC5 with bundled software is quite a reasonable proposition.

News on the new Amigas is still that we can expect them real soon now, as in around May-June. Meanwhile, Amigas continue to sell in earnest.

In this issue we take a look at Personal Publishing - programs that produce practical results with a little help from a printer. Phil Campbell reviews *Certificate Maker*, and Eric Holroyd (also seen at a famous night spot in Sydney's Rocks playing the trumpet) takes a look at *Toyshop*.

I played *Auf Wiedersehen Monty*, and chose it as hands down Game of the Month, whilst J.Mark Hunter cruised around Cairns in search of aboriginal software.

Adventurer's Realm is back, never to part again.

Andrew Farrell

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RAM RUMBLINGS

New CAD package for Amiga

Commodore has announced the Australasian release of a powerful new Computer Aided Design package called Aegis Draw Plus for the Amiga.

Commodore National Product Manager Mr Tony Cuffe said, "Aegis Draw Plus is a real CAD package that uses the Amiga's hardware to its maximum capability."

It offers the features one would normally expect in a professional CAD package worth eight times the price.

Aegis Draw Plus allows up to six independent drawings of 256 layers each to be worked on using the basic 512K Amiga.

Draw Plus is controlled either with the mouse and pull-down menus, or entirely with the keyboard for more advanced users.

Drawings can then be saved in the Amiga's standard IFF file format for use in other programs, ie Deluxe Paint.

Commodore believe Draw Plus will be used by professionals because of its versatility, ease of use and low cost compared to similar software packages on the market.

":I see Draw Plus being used not only by architects and in the building industry but also by advertising art departments and in the television industry," Mr Cuffe said.

The program was especially designed for use on the Amiga and takes advantage of the computer's graphics and multi-tasking power.

Aegis Draw Plus recommended retail price is $445.00 - a considerably lower cost than other CAD packages.

Problems solved for database users

A problem peculiar to Amiga users in Australia has resulted in an enhanced database package being developed in the UK.

The story began when Amiga users here found a problem with Superbase Personal from UK based Precision Software.

It came to light when it was noticed that the page length was not being set correctly on the printer.

An investigation by Precision revealed that the trouble lay in the Amiga operating system itself.

So after identifying the problem, the Precision software experts took the necessary steps to remedy it, and upgrade the product.

Version 1.046 includes greater provision for keyboard operation with an increase in the number of defined keys and improved directory changing. The TODAY system date can now be used in field formulae.

Superbase Personal first went on sale in Australia six months ago and despite the page length problem has been a best-seller.

"The page lengths are different in Australia," explains Precision's Marketing Manager, Dr Bruce Hunt.

"The Amiga now accepts the commands from Superbase Personal to set the specified page length on Epson, Diablo and other types of printer."

Superbase Personal is a powerful database that places no limits on the number of fields or on the size of the record. And as many files as needed can be opened up to build a relational report.

This multi-file relational database incorporates all the latest user-friendly techniques. Data manipulation is achieved by the click of a mouse on video recorder style symbols on screen.

Thing Bounces Back

Gremlin's springiest star is set to bounce straight back into a new adventure.

After a much needed recuperation, Thing's oiled his spring and is raring to go. You'll remember that in his last encounter with the evil toy goblin, his mission was to save the world from the hedeous and monstrous toys, pouring from the underground factory.

Having dealt finally with the toy goblin, who reigns no more - the challenge this time is for Thing to finish the job and stop the factory computer auto-producing the toys.

As super fit as ever, Thing must bounce round the factory complex in his search for software to aid him in his re-programming venture. He can alter the layout of the rooms through which he reveals to suit his purposes, and has access to the factory pipe network; Thing travels through these pipes at breakneck speed to get from screen to screen.

As always, our hero's life is not easy. Weird and wonderful goblins lurk in every location, anxious to deplete Thing's oil stocks. If reduced by too much, or if Thing bumps his head too often, his spring seizes up.

Thing bounces constantly, so keeping him from danger is not easy

Thing Bounces Back will be available soon.

LETTERS

TO THE EDITOR

Dear Andrew

I am writing in reply to all the people out there who have Riteman C+ Printers and can not get them to work with the *Print Shop* Non Commodore Mode.

The first thing that you must do is flick dip switch 3 to on, which makes the printer Epson compatible. Next you must type in the following program into the actual loader of the *Print Shop*.

Type in exactly as follows:

```
231 OPEN 4,4
232 PRINT#4,CHR$(27);";";CHR$
(10)
233 CLOSE4
```

If you wish, you can resave the loader so that you wont have to type it in all the time. Make sure that the printer is switched on when you run the loader or it will not work.

Darren Brown
Doncaster, Vic.

Dear Sir

This is regarding the article on State Affair's second last edition concerning the "HACKERS" or "Computer Criminals"

I'm only fifteen and belong to an organization called RATT. Ratt consists of seven members who enjoy hacking. The public have got the wrong idea about people like us, and for this reason we would like to set the record straight!

Let us give you a few facts

a) The word Hacker means - expert of a system, or one who is capable of gaining access to computer system. IT DOES NOT MEAN CRIMINAL!

b) Hacking is not just a problem of the USA but it is here in Australia. And every other nation of the world!

c) Most hackers infiltrate security systems to prove simply that they can do it, not all of us set out to destroy or rob companies etc.

I started hacking because I liked to "walk near the edge". Also people like us sometimes considered rejects of society for this reason we turned to hacking to prove that we belong. My friends and I then created RATT. Over the years that it has been on line we have gained access to banks, companies, government services and the like both here and abroad. We never had any trouble gaining access to computer systems. We did it because it was fun, considered daring, dangerous, and illegal.

We didn't set out to do anybody any harm and I don't think we did, had we realized that, what we had learnt from hacking, could in fact do great harm and it is for this reason that we have given it up. Also we urge other hackers to do the same.

Ratt is known amongst "other hackers" in Australia and abroad, some think that we are only one person, some think that we are several (and some don't care). But we have earned a type of respect from some hacking groups, and we hope that all hackers in Australia at least, will see what we are trying to do, in warning people against hacking and advising companies etc on how to prevent hackers getting into their systems.

Some of you, the public, will laugh off this letter, but we don't care! This is our way of warning you and it is up to you as to whether or not you take notice of it. But remember not all hackers are like us and only LOOK through your systems, but some will try to destroy and rob them.

YOU HAVE BEEN WARNED!!
Please Take Heed!
SHADOW, RAPUNZEL, IGOR, GRIZZLY, PHANTOM, WIZ THE TERMINATOR!!

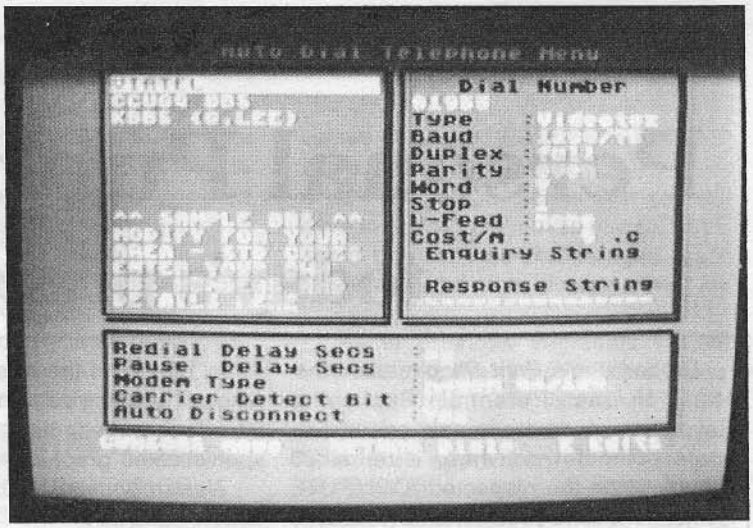
Dear Sir

I recently purchased the game *Space Harrier* on tape and found it would not run on my C-128. It seems to load normally, but near the end of the tape the screen goes black and the tape stops. After some experimentation I found it would work if I held down the commodore key and pressed the reset switch to get back to the startup screen. This restarts the tape movement and the screen turns blue. All you need do to start the game then is press the run/stop key.

I don't know if this is just a bug with my copy or if it is something more serious, but I hope this little tip will help anyone who is having any problems.

Keep up the good work as you have a great magazine that is really needed by us poor game freaks (games are too expensive) and I look forward to when my next issue arrives in the mail.

Yours sincerely
Bruce McCready



MACRO's up to 33 characters in length. All the alphabet keys are also redefinable to various page numbers that you may access frequently.

Documentation is adequate, however the print size is way too small for true hackers, whose diminished eyesight is an equally great hindrance when travelling in automobiles.

One thing lacking was a simple step by step approach to operation, guiding non technically minded users to a quick hook up. It took me a while to discover the correct positioning of the switches in order for the auto-dial operation to work correctly. This problem is further hindered by the rather ambiguous naming of the switches on the modem.

In an attempt to simplify certain aspects of life, Netcomm have omitted accepted terminology such as 1200/75 and 300 on the baud rate selection switch and chosen more simple HI/LO. For those intending to buy, try putting the switches from left to right:- up, up, down, down. Set this way, the audible feedback on dialling is heard, and the computer is able to correctly control baud rate selection, and other terminal parameters.

Conclusions

GP Term has so many smart features I could fill another page just naming them. A very carefully thought out package that shows the results of testing, and usage by programmers who were interested in more than simply producing a run of the mill terminal program.

Coupled with Netcomm's modem technology that won them the Australian Hardware Division First Prize in 1985, the entire package packs a mean punch at less than $300, excluding tax.

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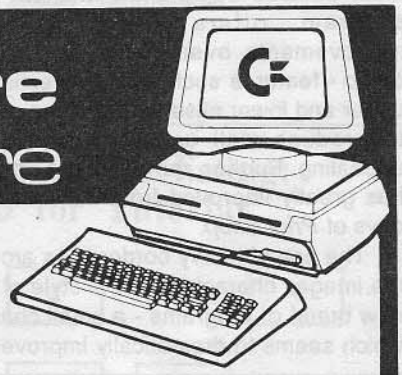

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Personal Publishing -
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Broderbund's *Print Shop* marked the start of the Personal Publishing Revolution. A dramatic new concept in home computer software, it remained Number 1 on the respected "COMPUTE Hotlist" for over a year. When Broderbund released *Printshop Companion*, adding many useful new features to the main program, it too shot to the top of the best sellers list.

Print Shop offers the choice of a number of well designed fonts, a number of border designs and a large range of illustrations. Success has of course spawned many imitators, perhaps the most obvious being *Print Master*. This program offers a number of improvements over the original *Print Shop* - features such as full selection of upper and lower case text, and the ability to produce wall calenders are quite appealing. Further, the quality of artwork has greatly improved from the dotty old days of *Print Shop*.

The use of heavy border lines around the images characterises the style of this new breed of programs - a small change which seems to dramatically improve the visual appeal of the illustrations. A wide range of shading patterns has also been introduced, resulting in some very sophisticated graphics.

Newsroom soon followed, a program which allowed the production of newsletters, brochures and "newspapers" - text and graphics could easily be combined into newspaper style columns. As usual, the program was followed by the release of various clip art collections - even though the original program offered 600 high quality pictures. Five typestyles are available for entering text with the program's built-in word processor, which includes a "picture wrap" feature which automatically arranges text around illustrations. An impressive feature of *Newsroom* is the "Wire Service", which allows text to be sent and received between IBM, Apple or Commodore computers while maintaining full formatting.

Printing programs have tended to become more and more specialised as time has passed. Thus, *Certificate Maker* allows only the production of certificates - a fairly limited application.

Mask Parade is a new release from Springboard - a game program which allows children to design their own masks, incuding hats, glasses, jewelry and accessories. The mask is then printed out, coloured, cut out and worn. Sounds like fun!

Toy Shop, from Broderbund, is in a similar vein. Full working paper models - from airships to cars to steam engines - are designed and customised on screen, printed and cut out for assembly.

Create with Garfield offers a variety of typefaces and illustrations of the famous feline. You can design your own Garfield comics, as well as printing posters, labels, place cards, and letterheads. In fact, the applications are only limited by your own idea of good taste.

Home printing programs have taken off, and more and more creative packages are appearing. Those with the most appeal are the ones which are the most flexible - yet all are exciting and fun. The creative potential of the humble dot matrix printer has been unleased in a big way!

Certificate Maker
Certificate Maker Library Volume 1

reviewed by
Phil Campbell

Distributed by Dataflow Computer Services (02) 331 6153

Are you a jerk? The type who loves giving your friends a "Mr Know-it-all Award" or a "Foot in Mouth Award". Or perhaps a "Certified Idiot" certificate? Yes? Then *Certificate Maker* is the program for you.

Certificate Maker and *Certificate Library Volume 1* are produced by the very American company Springboard, and distributed in Australia by Dataflow. These are the companies that brought you such classics as *The Newsroom* and *Newsroom Pro*. *Certificate Maker* is very similar in style to these programs and is also similar in presentation quality. My only reservation, and it's a big one, is that *Certificate Maker* fails to bridge the cultural gap between the good ol' US of A and down to earth Down Under.

Certificate Maker is aimed squarely at the "Any fries with your Big Mac, sir? Have a nice day, sir" mentality. The "Golden Arches Syndrome". But then again, everyone loves going to McDonalds, so I may have to eat my words. With a sesame seed bun and special sauce, thanks.

What am I talking about? Merely the whole crass, corny Americanism that lies behind evey aspect of the *Certificate Maker* package.

The brochure tells us that *Certificate Maker* provides over 200 awards and certificates to "recognise, reward and encourage all kinds of achievement. It's perfect for use in schools, clubs, businesses, civic groups or at home".

Let's think about that for a minute. You have just clinched a major corporate deal - millions of bucks profit. Your boss is delighted, so he ducks into his office, powers up the corporate C64 and prints

Over 200 certificates to choose from! Here's a sample.

out a quick "Employee of the Week" certificate to present to you during the afternoon coffee break. How do you feel? Perhaps you would have preferred a "Hardest Worker Award"? In any case, I guess the only appropriate response would be to say "Shucks, boss, it was nothing", as you hand him a beautifully crafted "Best Boss Award".

Meanwhile, you've earned a great reputation as the office joker. You're the guy who hands out "Horrible Mention" cerificates, "Dead Carp Awards" and "Most Coffee Breaks" certificates. You definitely deserve the "Company Clown Cerificate".

"Enough's enough", I hear you cry. But there are plenty more. It's hard to know which I find the more distasteful ... the corny comedy certificates, or the supposedly serious recognitions of achievement. What this package does is to cheapen the whole idea of Award Certificates. The whole deal becomes so gushy and overdone that every day becomes "Academy Award Day". The whole idea of being awarded a certificate lies in the fact that it is a rarity. In the good old days they were beautifully printed, with goldleaf or red wax seals. Stylish. Now they just churn on out the end of your dot matrix printer.

Can I find anything positive to say about this milestone in Personal Publishing? Yes. In fact I am forced to admit that the whole package is put together extremely well.

It's easy to use, there are plenty of preconfigured printer and interface files, and getting started is a snack. The graphics are absolutely fantastic. They leave *Printshop* for dead. The fine detail and use of shading in the illustrations is brilliant. The border designs are excellent too. The main program (a two disk set) provides 24 borders, while the companion *Certificate Maker Library* provides another 24. Again, the fine detail is most impressive.

My only reservation is about the fonts used for printing the body of the certificate. Only five are available, two of which I would class as being sub-standard. Serif, Sans Serif and Art Deco are fine, but the Script and Gothic fonts look scrappy. It's not the limitations of the printer so much as the font designs that I find distasteful - for example, the serif on the bottom of the Gothic "h" points in a different direction to the serif on the "1". The visual effect is a little jarring. Such things are of course subjective - make up your own mind.

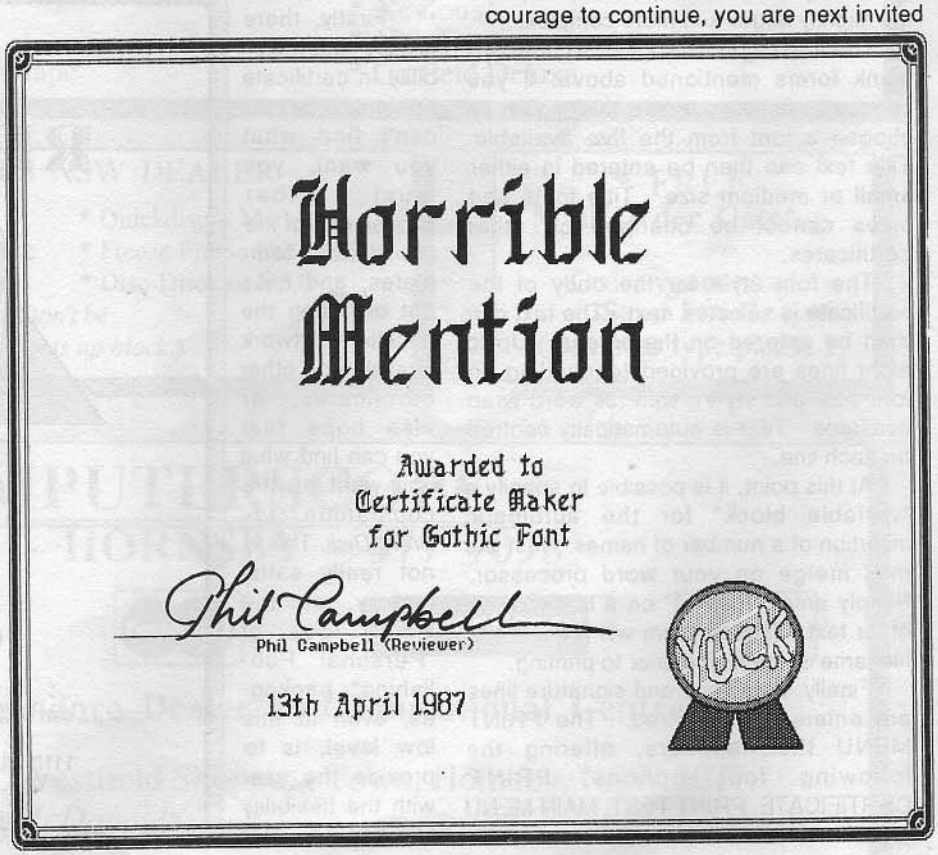
Anyhow, let's get back to square one and have a look at the package in operation.

Certificate Maker in action

When the irresistable urge comes upon you to make a certificate, grab the master disk and stick it in your drive. A good start. After the usual formalities, you are presented with a pictorial menu screen. Those of you who have used Newsroom will have a strange feeling of Deja Vu as you look at the screen. Those of you who have used Newsroom will have a strange feeling of Deja Vu as you look at the screen. That was a little joke. Get it?

Anyway, there's a nifty little picture of a typical office scene with a filing cabinet, desk and doorway. A guy, a girl and a cat complete the scene. Man, this is user friendly. Choose the desk (which is labelled "Make Certificate") if you wish to make a certificate. Go to the filing cabinet (marked "NAME FILE") if you wish to do a print run with a batch of names. If you are so overcome with nausea that you can't possibly continue, select the door - thoughtfully marked exit - to leave the program. I guess it's the door to the washroom.

Assuming you have got together the courage to continue, you are next invited



to enter a template number. Unlike *Print Shop, Print Master, Newsroom* and other such printing programs, *Certificate Maker* does not offer full freedom in configuring your document. Instead, you are provided with a huge selection of "templates" - certificate blanks into which you insert the information that you require. Thus, the certificate title and graphic image is preset, except in the case of two blanks forms which are provided. (It is not possible to place a graphic on these forms, but you can design your own title).

Simply flick through the 220 options displayed in the manual and find the number of the one you want. If the one you want is not there - say for example you really wanted a "Most Boring Story certificate - then I'm afraid you'll have to buy the optional *Library Disk*, which provides another 105 designs. Bad luck.

The next step is choosing a border. As I said before, the 24 options are all impressive. As the borders are selected from the menu, they are displayed on the screen. This is helpful. The display response is slightly slower than that of *Print Shop* at this point, but the displays are slightly larger and more complex.

The next option applies to the two blank forms mentioned above. If you choose to enter your own title, you may choose a font from the five available. Title text can then be entered in either small or medium size. Title fonts and sizes cannot be changed on other certificates.

The font style for the body of the certificate is selected next. The text can then be entered on the screen. Up to eight lines are provided (depending on font size and style), with full word wrap available. Text is automatically centred on each line.

At this point, it is possible to specify a "variable block" for the automatic insertion of a number of names. Just like mail merge on your word processor. Simply enter "*name*" on a line with no other text. The program will request the filename of the fill-file prior to printing.

Finally, date lines and signature lines are entered as required. The PRINT MENU then appears, offering the following four options: PRINT CERTIFICATE, PRINT TEST, MAIN MENU and CHANGE SETUP. Of course, the most crucial of these options is "CHANGE SETUP".

It is at this point that we all sink or swim. I was pleased and impressed: the menu offered "Star Gemini" and "Xetec Interface". I chose them, and everything worked fine. I have never had such an easy time! In other words, I was lucky. My equipment was included on the option list. But is yours? Who knows? However, the option list was impressive, and I'd say the majority of printer/ interface combinations is already supported.

Thats all there is to it. Select print and away you go. Your very own certificate factory churns away, providing you with a passport to immortality. You'll long be remembered as the guy with the certificate for every occasion. In fact, there's even an award for you. Certificate Number 54 - the "Master Certificate Maker" award.

Conclusion

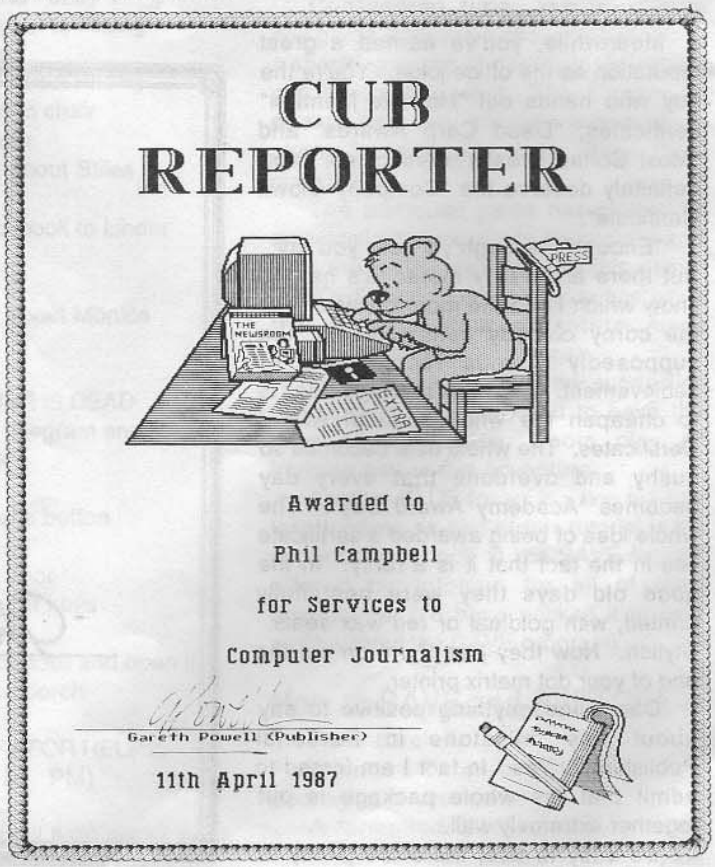
Certificate Maker is a well designed and well executed program. I have only two reservations.

Firstly, there is very little flexibility in certificate design. If you can't find what you want, you must either choose one of the two blank templates, and miss out on using the excellent artwork available on other certificates, or else hope that you can find what you want on the companion *Library Disk*. This is not really satisfactory, as the whole idea of "Personal Publishing" packages, even at this low level, is to provide the user with the flexibility to design just what he wants. The program bombs badly here.

Secondly, and most importantly to my mind, is that the program shows that there is a definite culture gap between here and the USA. At least I hope there is. I just would not want to be presented with a certificate produced with this program. The humorous ones are incredibly corny, and the serious ones so cheapen the idea of recognising and rewarding merit that the whole procedure becomes insulting. Feel free to disagree, but *Certificate Maker* just isn't my style.

RATINGS

Design: 75
Presentation: 80
Graphics: 90
Fonts: 60
Documentation: 80
Concept: 15



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The idea is that you stick your printouts onto the cardboard and carefully cut out the parts with a hobby knife (being careful to protect Mum's polished table first with a cutting-board!) and follow the directions to assemble the components. When assembly is finished and the glue is dry you can paint the job in your choice of colours using model-makers paints from your local hobby shop.

Balloon-power is used on a superbly-engineered and detailed model of a 19th century Steam Engine which actually works to produce power! It runs for approximately 15 seconds on one balloon and will drive a pair of "accessory" models: a Steam Table Saw and a Steam Oil Pump. These are very intricate models which will give hours of pleasure to young and old alike.

The manual for this outstanding piece of software is a lesson in how to write an instruction book. It's very easy to read and at the same time it's most thorough and comprehensive. You're taken right through every step of the job, from loading a model from disk, customising it, printing it out, then assembling the finished job.

It grades the models into three categories: Easy, Medium and Challenging, so as to give you an idea of the level of difficulty and it also tells you of the customization options available to each model.

As the program originates in the USA some of the terminology is different and needs to be explained. A couple of the models use a "penny" as a counter-weight for balance. This is an American 1c piece and you should use an Australian 5c piece as this is the closest equivalent.

For "card-stock" read "cardboard" and where they say under white glue "use Elmer's Glue-all" I found that "450 Stainless Adhesive" from the hobby shop was a good substitute. For "rubber stripping" read "rubber bands".

The Toy Shop is great family idea and you could make it a team effort to produce a particular model or even have several different ones"on the go" at once with everyone involved. How nice for father and son (or daughter and mum) to be able to say that "we made that together"!

It would also be a great idea for school use and I'm sure every school would benefit from having a copy for Handicraft courses. The package says "Ages 12 to Adult" but I know of at least one bright 10 year old who's having great fun with it. Teachers could make their own judgements as to its suitability for individual pupils and I feel sure that there'd be a lot of interest from the students. If the school has a good photo-copier I think that copies of printouts may be suitable to work from if a lot of students were doing exactly the some model.

So, any teachers reading this (and I know a number of you are computer enthusiasts) make some enquiries and I'm sure you and your students won't be disappointed.

There can't be too many people left who don't have Broderbund's *Print Shop* for their home computer, or at least know what the program does, but it too is a fine piece of software which, with it's recently-released *Print Shop Companion,* is a good recommendation for you to go out and buy this one.

My review copy of *Toy Shop* is only on loan to me and has to go back soon and I'm going to buy my own copy right away. That's how good it is!!

The price is a little higher than some single-disk programs, but don't forget that you get 3 disks with this one, plus all the cardboard and wire etc. Furthermore, if you have a look in the hobby shops you'll see that you can pay from $20 to over $150 for just one model-kit depending on size etc.

With that in mind, and remembering that *The Toy Shop* makes 20 different models, each with a big range of customising options, you'll see that it's a bargain price for a program that'll be good for years of fun and enjoyment. There are plans too for extra Toy Modules to be released in the future which would work with *The Toy Shop* master disk to make more models.

A refill pack of component materials is available from your software supplier and costs around $69. This is similar to the inclusions in the original pack as outlined above but if your supplier is temporarily out of stock you can use ordinary cardboard from the newsagents and coat one side of it with spray glue from an aerosol can. I've done this and it works well.

The wooden rods are one-eighth dowelling and the wire is paper-clip wire. It even says in the manual that if you run out of wire you can use a carefully-straightened paper-clip! Balloons, rubber bands and cotton string are all readily available too if you can't get hold of the refill pack just when you need it.

System requirements: Commodore 64 or 128, disk drive and printer (suitably interfaced). Check the pack for list of printers applicable.

Retail price is around $125 from good stockists everywhere.

The Toy Shop is distributed in Australia by Imagineering.

The carousel moved slightly to show the mechanism

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Spirit of St. Louis
Starship
Steam Engine
Steam Oil Pump
Steam Table Saw
Tractor Crane
Zoetrope

Raster interrupts

by Jason Briggs

The C64 has many different types of graphics facilities which the average user can use. I'm sure most of you have come to grips with Sprites, and UDGs. But how many of you can use the Raster Interrupt feature?

There should be some who will say, "I can." However, most people can't, which is a pity. Raster Interrupt Graphics is one of the more useful techniques.

RIG, or Raster Interrupt Graphics is used to display more than 8 sprites on the screen at once. You can divide your screen into half Hi-Res, and half normal text. You may, if you wish, have a small portion of the screen scrolling. The TV is completely at your mercy. Whatever your program needs, you can do it.

Although this article is written with the Machine Code programmer in mind, Basic buffs can also find some handy little routines. And as for the MC programmers, well, you should learn how to create your own Raster Splits.

This article won't be all fun and games. To perform such black magic we must first understand how the VIC chip creates a composite video image.

The T.V screen is made up of 312 lines (for the European PAL system, the U.S NTSC system only has 262 lines) ,which is one reason why software must be modified from U.S format to European. And vice-versa. These lines are drawn by a small electron beam called a RASTER, hence the name RASTER graphics. If you stop and think for a minute, the picture on your TV screen must be updated very quickly. When you see somebody walk across the screen, their movements are smooth, not rugged. This is because the screen is updated once every 60th of a second. Which is a little faster than I could do it!

Anyway, back to our quest. Now that you know what a Raster is, I'd had better explain to you what an Interrupt is. Put simply, interrupts are the life line between you and your computer. Every 60th of a second the computer generates an interrupt, and carries out its normal chores. Like reading the keyboard value, flashing the cursor etc. This routine, located at $EA31 or 59953, is called upon every 60th of a second no matter what. If the computer is running a BASIC or MC program, then it stops doing that and jumps to $EA81. (After the interrupt routine has finished, it goes back to what it was doing before the interrupt.) There are times when the interrupts are turned off, eg during a cassette load or save, turning the interrupts off saves a small amount of time.

Now that you know what a RASTER is, and what an INTERRUPT is, how do we use and combine them? Well, that's a very broad question, which I'll answer slowly but surely. So if I start to discuss something that appears to be out of the picture, then please just bear with me. All right, on with the show.

Activating your interrupt routines

The very first thing that we must do is tell the computer where our interrupt routine is in memory. This is done with great ease, all we have to do is change the Hardware interrupt pointers. These pointers are located at 788 and 789, or $0314 and $0315. Naturally we'll use the 6502 hi-byte, lo-byte format when pointing to our routine.

I must also stress that you turn the interrupts off while you're altering the pointers. The reason for this is pretty obvious, interrupts are being carried out once every 60th of a second. What would happen if an interrupt was called; and you had only changed the first byte of the pointers? Nothing too incredible,

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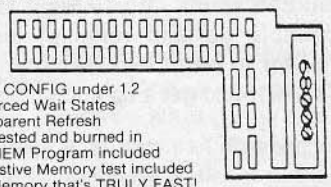

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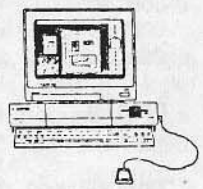

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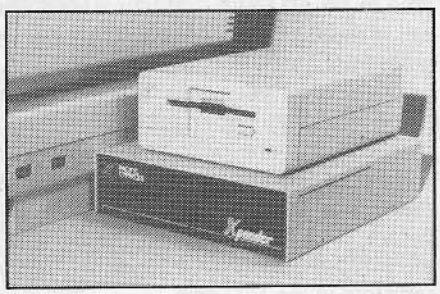

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just that the computer would jump to an unintended address. Then probably lock itself into a search for the meaning of life, the universe, and everything. So always turn your interrupts off during a change. And please, oh please don't forget to turn them back on!

Below I've included an example of hardware interrupts. This routine doesn't have anything to do with the RASTER just yet, but you have to be able to run before you can sprint. If you want to see the example up and running, just use a monitor to put it into memory, then use SYS49152 to get it up and going.

```
., C000 78      SEI  ;Turn off the
                interrupts
., C001 A9 0D   LD#$0D  ;
., C003 8D 14 03 STA $0314  ;Low byte
                for routines address
., C006 A9 C0   LDA #$C0  ;
., C008 8D 15 03 STA $0315  ;Hi byte
                forroutines address
., C00B 58      CLI   ;Turn interrupts
                back on
., C00C 60      RTS   ;Return to
                normal operations
., C00D AE 86 02 LDX $D020  ;Start of
                interrupt routine, which
., C010 E8      INX   ;simply
                changes the colour of
                the
., C011 8E 86 02 STX $D020  ;border
., C014 4C 31 EA JMP $EA31  ;Jump to
                the normal interrupt
                routine
```

As you can see, although the colour of the border is changing, you are still able to do anything that you want. This will include running, listing, and editing programs.

This is all very well, but it still isn't doing anything super fancy, and that's because we are only using hardware interrupts. We have not yet even touched on the RASTER beam. However, before I can throw you into the thick of it all, I had better explain all of the Raster registers in the VIC chip.

The raster registers

RASTER INTERRUPT REGISTER - $D012 53266

This register is the main gullet of it all. It is a multi-purpose register, meaning that it can be read (PEEK), or written to (POKE). If you use the PEEK command on this memory location, the value returned is the number of the TV line that is being drawn at that time. If you POKE a value into the raster register, then this will activate the RASTER COMPARE operation. In other words if you POKE53266,100, the computer will generate a Interrupt signal when the raster begins to draw line 100.

Important Note

Many of you may have noticed a problem that has arisen from the RASTER register. Everybody knows that 255 is the highest value that can be held within a byte. The screen, however, is made up of 312 lines. Which means that the Raster Interrupt Register does not account for 57 of those lines. Where are those values stored? Simple, in the seventh bit of byte $D011 or 53265. That would make a total of nine bits holding the Raster value. Which can easily cover 312. The reason why I have drawn your attention to this is because the ninth bit must always be set to 0. Failure to do so may result in your computer being 256 bytes out with the video display. I assure you that does not look very good at all.

IRQMASK INTERRUPT ENABLE REGISTER - $D01A 53274

Bit
0 enable raster compare
1 enable sprite-background collision
2 enable sprite-sprite collision
3 enable light pen
4-7 not used

This register is the central control point for the user interrupts. By changing the bits in this byte, you can choose to generate an interrupt for many different events. For example, if you wanted an interrupt to occur every time a sprite collided with another sprite, you would set BIT 2 in memory location $D01A (53274) to 1. However, we will be interested in bit zero. On power up, none of the special interrupts are activated. So we will have to set BIT0 to 1.

VICIRQ INTERRUPT STATUS REGISTER - $D019 53273

Bit
0 set by raster compare
1 set by sprite-background
2 set by sprite-sprite
3 set by light pen
4-6 not used
7 set by ANY Vic generated interrupt

The purpose of this register is to tell us exactly what the cause was, of any interrupt. If BIT1 is set to 1, that would mean an interrupt signal has been sent because a sprite-background collision has happened. The bits in this particular byte are latch bits. Meaning once they have been set to one, the only way that they are reset to zero, is by the programmer. The reasons for this are quide obvious. Firstly it stops the same interrupt from occurring before the first one has been processed. And secondly, it enables a programmer to have multiple interrupts logged up. And thirdly, it means the processor can't continually interrupt itself. Which means sooner or later, the computer will have to get some work done. That's a good thing for us.

As mentioned above, all the bits in this byte must be manually reset, after processing the interrupts. This is quite easily done, all you have to do is read its value, then write that value back into the byte.

How to set up raster interrupts

Setting up the computer to handle Raster interrupts is a little different to the normal hardware interrupts. The part about the pointers remains the same, but now you have a number of other memory addresses to prepare. Like the Raster etc. The steps that you will have to carry out are listed below, in a logical order.

- Turn off the interrupts.
- Change the interrupt pointers, to point to our routine.
- Enable Raster interrupts, by setting bit0 of $D01A to 1.
- Set the Raster compare registers in $D012 and $D011 to the first line.
- Turn the interrupts back on.

- RTS, Return to normal operations.

And that's about all there is to it. But that's only setting up the Interrupts. The fun part comes now, where we have to write the routine, which handles the Raster Interrupts.

Raster Interrupt Routine

Now we move onto the main event, the Raster Interrupt Routine. So how do we go about developing a routine to split the screen? Well, to save time, space and money, I've done you up a little list of steps to take.

Before we go on with this though, you have to know about one little snag. And that is to do with the timer interrupts. These are generated by the CIA (Complex Interface Adapter). What do you think would happen, if a raster and timer interrupt are generated at the exact same time? Well, it would cause a mix up in timing. And that results in non-desired screen flicker. So that's the problem, how

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do we fix it? Easy, simply read the interrupt timer register. That's located at $DC0D or 56333. The steps that we'll follow are listed below.

- Check cause of interrupt.
- If it is the raster then go to split routine.
- Otherwise clear timer register, and jump to $EA31.

SPLIT ROUTINE
- Check if raster beam is at line 2.
- If it is, then jump to screen modifications for line 2.
- Otherwise modify screen for line 1.
- Put value for line 2 in the raster register.
- Jump to $EA81.

SECOND LINE
- Modify screen for line 2
- Put value for line 1 in the raster register.
- Jump to $EA81.

The above list is really the basis of any interrupt routine. To divide the screen up into 3 sections is easy, all you have to do is check for the third line. Followed by the second, then the first. The number of splits that you have on a screen is entirely up to you. Below is a disassembly of a raster interrupt routine, written using the above rules.

```
., C000 78       SEI  ;Turn off the
                      interrrupts.
., C001 A9 1F    LDA #$1F   ;
., C003 8D 14 03 STA $0314  ;Patch in
                      our interrupt routine.
., C006 A9 C0    LDA #$C0   ;Which is
                      located at C01F.
., C008 8D 15 03 STA $0315  ;
., C00B A9 64     LDA #$64  ;Place in
                      first interrupt line,
., C00D 8D 12 D0 STA $D012  ;into
                      Raster register.
., C010 AD 11 D0 LDA $D011  ;
., C013 29 7F    AND #$7F   ;Clear Bit 7,
                      in memory address
., C015 8D 11 D0 STA $D011  ;$D011.
., C018 A9 81    LDA #$81   ;Set up the
                      computer, to generate
., C01A 8D 1A D0 STA $D01A  ;interrupts
                      by Raster compare.
., C01D 58        CLI  ;Turn interrupts
                      back on.
., C01E 60        RTS  ;Return to normal
                      operations.
., C01F AD 19 D0 LDA $D019  ;Check
                      cause of interrupt.
., C022 8D 19 D0 STA $D019  ;Clear
                      interrupt mask register.
., C025 29 01    AND #$01   ;Is it a
                      Raster interrupt.
., C027 D0 07    BNE $C030  ;If yes then
                      jump to split.
., C029 AD 0D DC LDA $DC0D  ;
., C02C 58        CLI  ;Clear timer
                      interrupts.
., C02D 4C 31 EA JMP $EA31  ;Jump to
                      Rom interrupt routine.
., C030 AD 12 D0 LDA $D012  ;Check if
                      the Raster is at line two.
., C033 C9 A4    CMP #$A4   ;YES??
., C035 B0 10    BCS $C047  ;If so, jump
                      to line two
                      modifications.
., C037 A9 07    LDA #$07   ;This is
                      modifications for line
                      one.
., C039 8D 20 D0 STA $D020  ;Changes
                      the screen and border
                      to,
., C03C 8D 21 D0 STA $D021  ;yellow.
., C03F A9 A4     LDA #$A4  ;Then set
                      the raster interrupt for,
., C041 8D 12 D0 STA $D012  ;line two.
., C044 4C 81 EA JMP $EA81  ;Jump to
                      NEW Rom interrupt
                      routine.
., C047 A9 08    LDA #$08   ;This is
                      themodifications for
., C049 8D 20 D0 STA $D020  ;line two. :-
                      Changes border and
., C04C 8D 21 D0 STA $D021  ;and
                      screen to orange.
., C04F A9 64    LDA #$64   ;Place the
                      value for line one into
., C051 8D 12 D0 STA $D012  ;the
                      rasterregister.
., C054 4C 81 EA JMP $EA81  ;Jump to
                      NEW Rom interrupt
                      routine.
```

As you can see, the above disassembly is clearly marked. However you had better note the slight alteration in the return address, after a raster interrupt. The reason why you Jump to $EA81, and not $EA31 is because we have already modified the screen. So when you enter back into the Kernal Rom routine, it is a must that you skip some the original screen routines.

Now for all of you BASIC buffs, I've given you a Basic loader of the above machine code routine. Along with some memory addresses that will enable you to modify the program for your own needs. However, first things first. Type in and run the basic loader. There is, of course, a checksum routine. That will tell you whether you got it right or not.

```
10 ********************************
20 *  RASTER INTERRUPT ROUTINE   *
30 *     (C) 1987 JASON BRIGGS     *
40 ********************************
50 FORI=49152TO49238:READA:
POKEI,A:CH=CH+A:NEXT
 60 IFCH<>10374THENPRINT"[CLR]
ERROR IN DATA LINES":END
70 PRINT"OK...."
 80 DATA
120,169,31,141,20,3,169,192,141,21,3,
169,100,141,18,208
 90 DATA
173,17,208,41,127,141,17,208,169,129,
141,26,208,88,96,173
100 DATA
25,208,141,25,208,41,1,208,7,173,13,2
20,88,76,49,234
110 DATA
173,18,208,201,164,176,16,169,7,141,3
2,208,141,33,208,169
120 DATA
164,141,18,208,76,129,234,169,8,141,3
2,208,141,33,208,169
130 DATA 100,141,18,208,76,129,234
```

It is a rather small, but very effective routine. Once it has been placed into memory, simply type SYS49152. TAR-DAR!! If you have what I intended you to have, then there should be a split in the screen' colour. Pretty tricky eh!! But it may not be the size or colour you want, no problems. The following information will help you to customize the routine.

MEMORY ADDRESS	PURPOSE
49208	This holds the colour for bar #1.
49224	This holds the colour for bar #2.
49164 & 49232	These hold the value for raster line #1.
49204 $ 49216	These hold the value for raster line #2.

The above table is pretty simple to understand. If you poke a new value into a above memory address, the raster split will be modified.

But you should know, that if you are going to change the size of the split. eg. line #1 to 50, then the value of 50 must be poked into both 49164 and 49232.

Well, that's about as far as I'll go. The rest of discovery is up to you, after all that's the main fun of computers.

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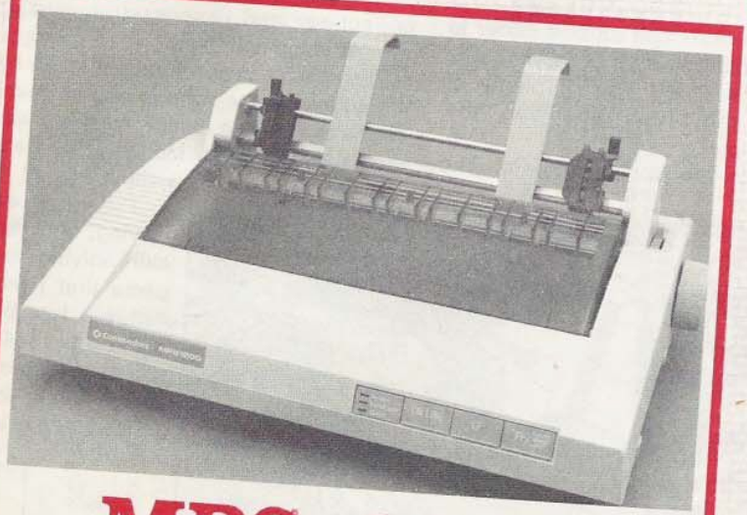

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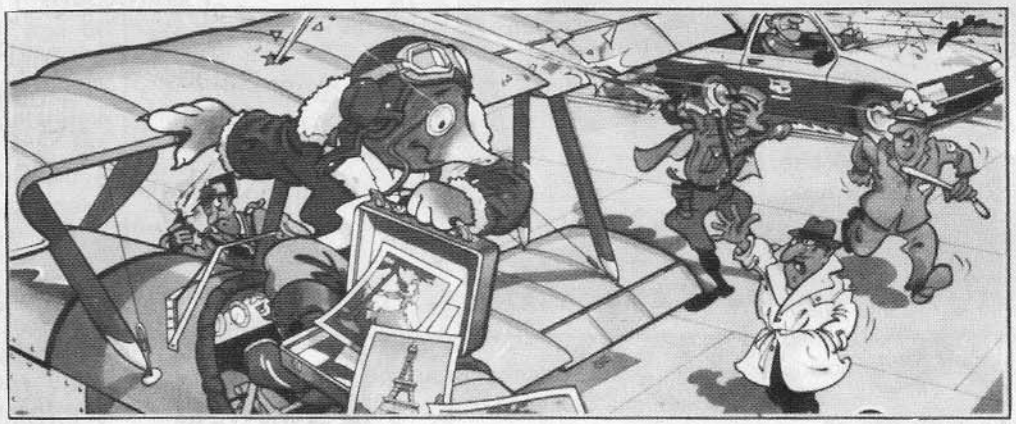
BEHIND THE SCREENS - GAME OF THE MONTH

Auf Wiedersehen MONTY

by Andrew Farrell

Here it is! The last of the trilogy starring the world's most famous mole, who, despite blindness, has now managed to star in not one, but three big selling computer games.

In the final installment of the adventures of Monty Mole, we must guide our fur ball friend across Europe in search of funds to purchase the Island of Montos.



Travelling in the usual ladder and levels fashion, Monty must jump, climb, fall, slide and somehow squeeze through in excess of fifty frames full of action. Starting at the Rock of Gibraltar there are various items to collect to aid in the solving of various puzzles. There are also travellers cheques scattered about which need to be picked up to boost the bank balance.

Travelling around Europe may be done by land or air. Find yourself an air ticket, head to the nearest airport, and fly to the next stop along the route. In transit you may nibble the back of passing planes to gain extra points.

So far I have managed an all time high of just over 6200, and explored as far North as Sweden, and East as Austria. In between we passed through France, Spain, Belgium, Netherland, West Germany, Denmark and Luxemburg.

Each country has its own identifying characteristics. Visit the leaning tower of Pizza, climb the Eiffel Tower. In Dodgy Austria you must find tools in order to repair a cable car, and make your way down to the Graz. There's plenty of surprises that rope you into the fascinating plot.

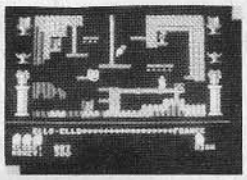
Graphics are up to standard. The music is tense and fast, but you don't have to put up with it once it starts to grate on the ear drums. Press F8 and only sound effects are heard - which are simplistic yet effective.

Gremlin have done well to take Monty so far. However, I feel that this version does lack some of Crowther's innovation that might have been expected had he still been involved with the game that he originally launched. At first I was unimpressed by the screenplay, however the frames improve dramatically after the first few which seem a little on the easy side.

I enjoyed the unexpected changes in landscape, and occasional operational scenes. The flight segment seems a little lost, but provides a pleasant break from the restrictions of earth. It's easy to knock up a high score by doing plenty of flying, but the big points come in collecting and successfully using objects at the right time.

Impressive action, brought to life by the cute character who in one segment does a swift dance routine, complete with breakdance moves. Monty is the hero without a doubt.

I enjoyed playing, and am still solving the game that I predict will fast become a big seller like its predecessors. A classy exit of an entertaining series.



Game : Auf Wiedersehen Monty
Publisher : Ocean
(Distribution Not Yet Finalised)

Graphics:	87
Music:	92
Sound:	86
Presentation:	90
Playability :	91
Overall :	90

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Behind The Screens

Zub

To retrieve a stolen jewel. The green eye of Zubi. (Hey, I didn't write this, okay.)

Your mission is simple enough. Travel to the many planets undetected using the Zub Teleport Network. Each planet has three teleport units which are in orbit a mile or so above the planet's surface. To reach them you must negotiate a series of floating platforms which can be moved left or right under your control. Each of the three units will transport you to a different planet within the Zub system.

Each planet is protected by its own fleet of security robots. Some of these are relatively harmless and will merely attempt to push you off the platforms. Others, however, are armed, so these have to be approached with extreme care. And the biggest hassle is the presence somewhere of a perfected prototype "ZIRK BOMB". If you encounter anything that looks even

Spiky Harold

Quite an amusement. Hibernation time in the porcupine world and you play nursemaid to the needled creatures.

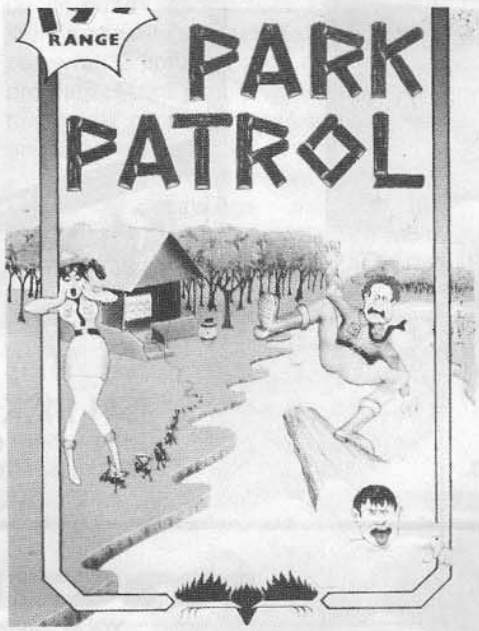
Yes, you're seeing it right . . . a fun change to a splendid world of innocent delight.

You're to assist the echidna cousin to settle in for the winter and stock his dirt walled pantry with the most edible of nature's raw delicacies.

He hangs out in a place called Hedgerow, and underneath this critter causeway is a veritable supermarket of woodland smorgasbord menu selections ranging from ferns to apples to bugs and berries. You take the double-coated mohawk species down below and shop his heart out, but certain computed mysteries are set to obstruct your crawl path. We're talking the creatures who will try to stop him as well as conkers, sulphur clouds, bouncing balls and peeping periscopes. Yeah, the Hundred Acre Wood isn't the same any more.

But aside from food stamps, Harold

Park Patrol



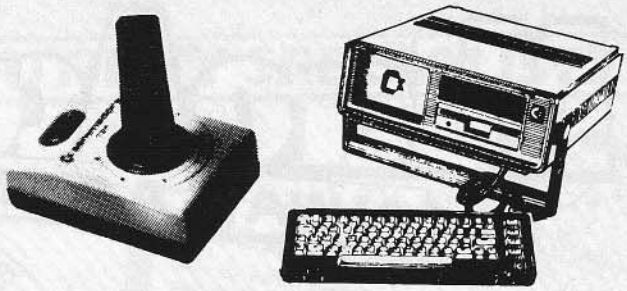
There was this incident in the St Clair National Park in Tasmania. It involved a young 19-year-old girl by the name of Roberta who was in charge of the wood pile. Campers paid her money for a certain quota of chopped logs and wood chips for the night's fire.

Then there was this bikie gang that rolled in from Launceston and started hassling the family group in the neighboring site. This went on most of the first day, and that night when they went to the wood pile for their wood they got sight of Roberta and began bothering her.

Five of them were standing in the lumber yard hassling Roberta when the father of the group next to them came in and warned them to leave her alone or he'd call the park police. They figured they'd cool out just that once, but the next night when Roberta had locked the gate to the woodpile and stayed away until they left, the bikie gang in a desperate need for fire fuel decided to use the touring family's tent as a substitute.

It doesn't get as unpleasant as that in *Park Patrol* the game but there's enough trouble to keep you busy.

It takes place in an area known as Papatoetoe Park. The old park keeper Percy Nuttling has had a nervous breakdown and the place has got pretty tumbled. You are invited to take up the challenge of becoming the new park patrolman. As park ranger you are equipped with a raft, snake repellent and a few morsels of nourishment.



remotely Zirkish then get the heck outta the system. The effects of activating such a device could be disastrous.

The mission is simple enough, the actual palyability may be too simple. From the low-rent side of two, the manufactures haven't exactly poured their heart into perfecting a dynamite game. But Zub is interesting, especially for someone that likes teleporting to exotic moon expanses and watching a little dude in a blue suit and red laser-studded helmet do his stuff for King and Zub country.

The graphics are pretty basic and flushed out in colour that falls a considerable distance short of mega-fantastic. No music in Zub, from Mastertronic Added Dimention, but the sound effects are smart enough for the game.

Game: Zub
Machine:Commodore 64
Distributor:I.S.D.
Publisher: M.A.D.
Price: $11.98 cass.

Graphics:	52
Presentation:	33
Documentation:	47
Sound:	47
Playability:	38

finds coins along the way which bestow upon him extra lives, and wine glasses that get him drunk and chill his quills. Just some of the mishaps going down as you trek the lower earthen corridors in search of all 57 food items. When this hyper-marketing is complete he then must be escorted to his home cavern where he can then kick back all winter and sleep his brains out.

And, on top of it all, you've only got limited time to get this little pricky dude fed . . . only 24 game hours or that's it - you'll have the National Parks and Wildlife Society and the Computer Editor of the Sydney Morning Herald on your case.

It's a blast of a game. Harold is a cute little, smirk-inducing son of a gun and every trip of the food trek is very enjoyable and totally absorbs your interest in what's been carefully designed. The graphics and sound effects are of excellent standard and complemented by really fine colouring.

So good they send a quiver down Harold's spine.

Game: Spiky Harold
Machine: Commodore 64/128
Distributor: I.S.D.
Publisher: Firebird

Graphics:	87
Sound:	92
Presentation:	80
Documentation:	79
Playability:	67

Your task is to clean the litter up, watch for swimmers in distress and keep the park wildlife in line.

Papatoetoe Park though, is no place for urban guerillas and is full of nature-type hazards such as swamps, snakes and swimmers who will sink your raft, river logs and food stealing ants.

It's an entertaining excursion into forest frolics. The park ranger character is very amusing and the manoeuvrability of his shore perambulation and water rafting adds greatly to the enjoyment.

On land you press fire to hop over objects like turtles that make you disappear into the ground if allowed to touch you but that provide you with extra points if you run over them in the water. On land too, you walk over litter to pick it up and collect points, but swimmers that need help have to be runover with your little speed raft.

A monitor at the bottom of the screen indicates the amount of litter collected and the level of calories that can be revitalized in the supply hut or from stolen ant food. But be careful that when bobbing for credits in the water you only go after a swimmer if the "Help" sign flashes, which is the only indication of distress. Put-putting over a swimmer without it causes your raft to sink and Papatoetoe Park loses another ranger.

The music in *Park Patrol* is inadequate and does damage to what are some okay graphics. Perhaps not as exhilarating as an outer space dogfight in some hotted-up jet, but in this game you go bush and the simpler things in life become the best things, even in computer simulation.

Game : Park Patrol
Machine: Commodore 64/128
Distributor : I.S.D.
Publisher : Firebird
Price : $9.98

Graphics:	78
Music:	39
Sound:	62
Presentation:	76
Play:	88
Documentation:	70
Overall:	69

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"Freeze Frame" can be brought into operation at any convenient point by **pressing the button** on it. You can then do one of three things –

1. **Pressing "D" will save a working version of the program in memory to a formatted disc. This version will include an auto booting very high speed reload (many programs reload in less than 30 secs).**
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SERIOUS WARNING: THIS IS AN EXTREMELY POWERFUL PRODUCT AND IS STRICTLY FOR PERSONAL USE. DON'T COMPARE IT WITH ANY OTHER PRODUCT, NOTHING ELSE OFFERS THE POWER OF "FREEZE FRAME".

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"DUAL DRIVE NIBBLER" allows the use of two drives to make **even faster back ups.** Incorporates device number change software so no hardware mods necessary.

"EVESHAM 8 MINUTE NIBBLER" still very powerful and has been improved. Copies a few that the three minute version won't.

Many, many other useful utilities are included on the disc, including: **SELECTIVE MENU MAKER, FAST FORMAT, FAST FILE COPY, NOVATRANS, DISK ORDERLY, DISCMON+, UNSCRATCH, ETC., ETC.**

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Most routines are CBM 128 and 1570/71 compatible in '64 mode.

STOP PRESS!!

Many software houses are now using "Anti-Freeze" in their software. This renders ordinary back-up cartridges useless. We are now shipping "Freeze Frame Mk. 3B" which will deal with these programs. As far as we know other competitive devices will NOT. Most new software will be using this so don't forget if you want results you must buy "Freeze Frame".

Owners of Mk. 3 wanting Mk. 3B can upgrade for **$25.00**

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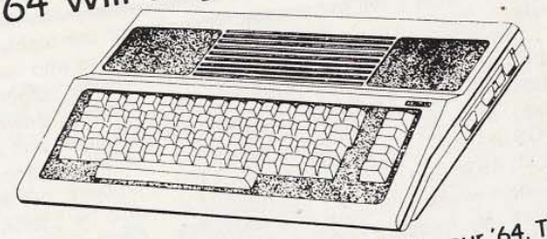

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The Super Column

by Paul Blair

There have been some enquiries from readers as to the current versions of *Superscript* and *Superbase* for both the C=64 and C=128. Because Precision Software has a policy of continual upgrading of their products, it can be a bit difficult to keep track.

With the help of Peter MacLaurin of Precision, here's the current list:

Program	Drive	Date/ Version
Superscript 128	404010	April 85
	8050	15 Nov 85
Superbase 128	4040	V2.07
	8050	V2.03
Superscript 64	4040	15 Nov 85
	8050	15 Nov 85
Superbase 64	4040	V2.03
	8050	V2.03
Easyscript	4040	12 Feb 85
	8050	12 Feb 85
Easyspell	4040	1
	8050	1
Superdesk 128	1571	6 Oct 86

Superdesk 128 is a special set, prepared by the major UK User Group (ICPUG) to help "new starters". If anyone is interested, I will get a copy for local use.

The references to "4040" and "8050" are really only pointers to disk format - "4040" is DOS 2A (35 or 70 tracks per disk), while "8050" is DOS 2C (77 tracks). DOS 2A also works with 2031, 1540, 1541, 1570 and 1571 drives, while DOS 2C also works with 8250 and 1001 disk drives. My frequent gripe about lack of simple facility for two single drives (e.g., units 8 and 9) is rather underlined by this list.

Superbase 128 (V2.07) now has a disk utility for recovering databases from 1571 disk drives. Earlier versions had the C=64 disk utility, which was not a lot of help with the 1571 drives.

If you want to update your current disk(s), then I suggest you contact Precision Software direct (6 Park Terrace, Worcester Park, Surrey, KT4 7JZ, England). They are quite well set up for this, and provided you send back your old disk, the cost seems to be about 10 pounds (which would be about $25 in our money, with postage included). As I have noted before, their turnaround time for orders is very short. They take plastic money, which will also help speed things up. If Commodore Australia has an "update policy", they might like to let us know.

Peter also pointed out a couple of lines missing from "SUPERBASE: THE BOOK". At the bottom of page 30/top of page 31 you should insert-

"...output or other processing. You can copy, rename, or delete lists.
"Memos
"These are created with the 'memo' option. They...."

By way of return, Peter has asked me to track down unconfirmed problems with RS232 printers when used with Super* programs. He has had reports that we in Australia are having some problems, but he doesn't know which program on what computer, nor does he have a clear idea of the problem itself. If you are one of those who has/had problems with RS232 printer output, could you help Peter by writing down the computer, which program and version, which printer and what the problem is/was. If you had a problem, but solved it, your notes would also be useful. Send any details to me (35 Calder Cres, Holder, ACT 2611) and I will collate them and send them on to Peter. Thanks in advance.

Now, a cuppla words of caution to those of you using the C=128/C=128D. The caution comes about because of some problems being experienced with the 1571 disk drive.

The cuppla words are: use only one side of any data disk.

Having destroyed a data disk myself, I will vouch for the wisdom of doing this. It seems that the 1571 has a few small problems when it comes to deciding which sectors on disk are "free" to receive new information. The Block Allocation Map (BAM) contains a "picture" of the disk, and figures out from that where there is free space. But on the 1571 its picture is cloudy at times, with the result that new information can be written over perfectly good, but older, sectors. The manifestation of the problem is a corrupted database.

At first I thought this was a bug in *Superbase*, but after working with 1571's doing lots of things besides *Superbase*, I conclude that there is no such bug in *Superbase*. That's comforting, but it does mean that the advice given above should apply to anything you do by way of storage on a 1571. Of course, if you have no need to write to a 1571 disk after it has been more than half-filled, then ignore what I say. Copying more than one side seems to work OK, and it is space efficient to take advantage of the extra 1571 capacity. But on data disks, try to keep at least 664 blocks free at any time. With *Superbase*, this may mean some extra housekeeping, but the pay-off is peace of mind.

And now ... SUPERBASE for the Amiga.

Now on sale (at least in the UK) is *Superbase Personal* for the Amiga. At some time in the near future there will also be *Superbase Professiona*l, a more advanced version.

The program is dongle protected, which is probably the fairest method of copy protection. This way, you can take archival copies of your original without the usual copy hassles.

Reading a review from overseas, I can only marvel at the incredible flexibility of this new offering. For example, with minimal effort you can view a file in Record View format (just a slab-like screen with all records left-aligned on the screen), Form View format (put the fields anywhere you like), or Table View format, with selected fields lined up neatly. Then you can alter the Form View display at any time simply by "grabbing" a field, "dragging" it anywhere you wish, and keeping on with the new layout in context. Neat.

But the versatility doesn't stop with screen tricks. Record layout can be

expanded, contracted, re-arranged, even key fields added at any time you like, all in the twinkle of an eye. All of this can be done without touching the keyboard.

Size is not likely to be a problem. *Superbase* will allow up to 16 million records - but don't ask me how you would store that many! Even a 40Mb disk would run out of room, especially if you do some more figuring and come up with the maximum file size of 17 Gb (gigabytes), which is 17000 Mb, or 400+ times 40 Mb. The reviewer notes that you could place the entire Unabridged Oxford English Dictionary plus all of the Encyclopaedia Britannica in one *Superbase* file. Why? I have no idea, but that's what he says, and who am I to doubt it?

I could go on quoting at length, but as I only wanted to whet your curiosity, I'll leave it at that for now, and come back with more details if you want. The Professional version? The differences seem mainly to be in the nature of an Application Form Builder, which is a neat style of screen and page design editor. There will also be a programming facility, and a word-processor.

In the UK, *Superbase Personal* will be a mite over 130 pounds, which would translate to about $300 here. The quickest way of getting any Precision product is to contact them direct, and their address is given earlier on.

That's it for now. We always welcome your letters, and appreciate any suggestions you have about things you want to see on this page.

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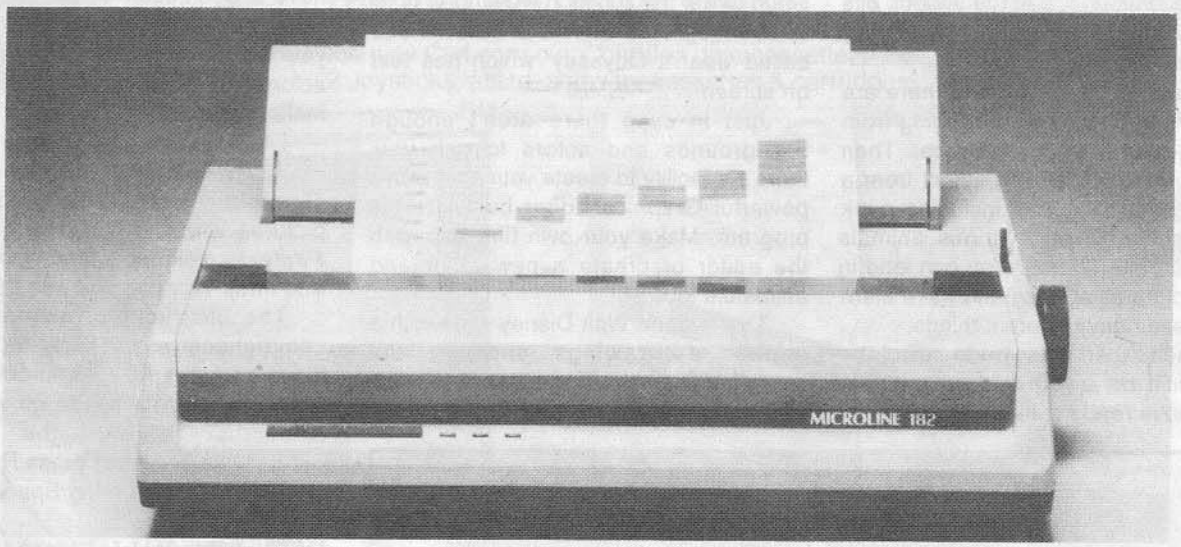

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Music Video Kit

by Eric Holroyd

Another program in the Sight & Sound music series, the Music Video Kit *is a 2-disk set, nicely packaged, and comes complete with 14 pre-programmed videos to show you some of the things it'll do.*

For a start, it's compatible with other music programs in the suite, ie *Music Processor, Music Video Hits, On Stage* etc, and you can "mix & match" the tunes from any of these albums into a video you produce yourself, if you don't want to use any of the 10 tunes on the disks already.

If that's not enough you can always use your own tunes created with the *Music Processor*. Music files for the *Video Kit* need to be prefixed with 'M.' so you may need to rename files from other disks, but that's easily done from within *Music Video Kit* as there's a complete set of Utility commands available from the menus.

To make a video you select (naturally enough) 'Create Video' and you're led through the menu to load the various bits and pieces which you'll be putting together for your video.

First is a 'Background' and there are 32 of them to choose from ranging from Undersea scenes to Outer Space. Then you need 'Actors' and you select from a huge range of 63 Actors including punk singers, scuba divers, various animals and lots of other figures. You can load in several actors all at once and have them all on screen doing different things.

The menu then gets you to select the music you'll be using and once that's loaded you're ready to have some fun.

Having loaded your background, actors and music you 'Record' your performance and animate the various actors with the joystick. Pressing the fire-button whilst recording puts you into 'freeze' mode which allows you to make all sorts of changes to the actors before restarting the recording, and you can really have some fun with this. A bird flying across the screen suddenly turns into a knight (or whatever actor you've loaded in) when you replay the video. Clever stuff and the only limit is your own imagination.

The manual says you can put text on the screen during a video but I couldn't seem to get this function working. It must work though, as there's a demo video called 'Jean's Odyssey' which has text on screen.

Just in case there aren't enough backgrounds and actors to suit you, there's a facility to create your own with a powerful Graphics Editor built into the program. Make your own film sets with the editor or create a new actor and animate it too.

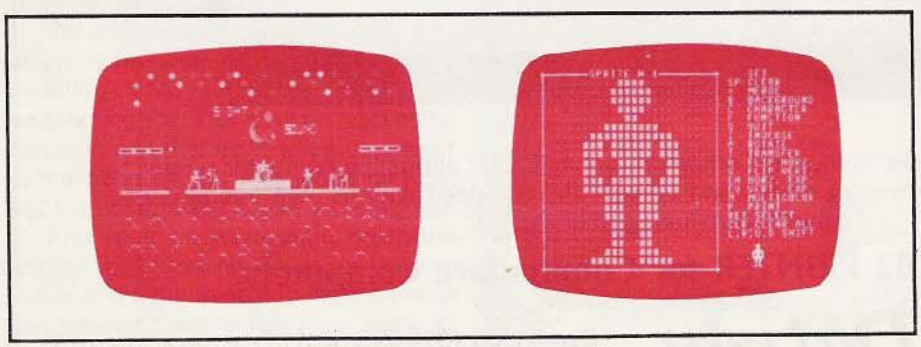
This is done Walt Disney style with a series of drawings showing the movements of the character. It's much easier than you'd think at first because all you do is draw the first one on the Sprite Editor's grid and then use the Editor's commands to flip and rotate the figure. You then save the various drawings on a data disk to start your own library of unique 'Actors'. The manual takes you through the steps of creating a figure doing cartwheels and it's pretty easy.

You can load in your favourite Koala picture to use a background (and if you have a Cockroach Graphics Pirate you'll have created lots of Koala pictures from your favourite games etc) and then put actors and music on top of this picture to make a video too.

I used the title screens from *Boulderdash Construction Set* and *Gunship* (which I'd captured as Koala pictures with the Cockroach *Graphics Pirate*) to make animated videos like this and I was very pleased with the results.

The instruction manual is quite comprehensive and easy to follow and the program is fully menu-driven - there aren't too many ways to go wrong. Just remember to read the on-screen instructions and don't press Return when you should be pressing Space and you'll be okay.

The program also includes a section for programmers who want to know how it all works and allows advanced users to create even more special effects. Using the example video called "Zing" you're shown various changes that can be made and what you can do to write your own sequences. There's terrific scope for



experimentation here.

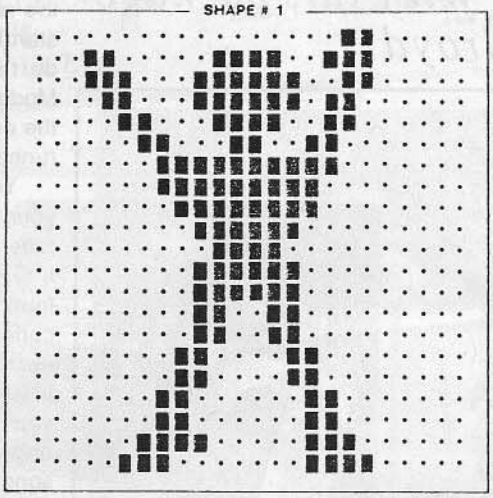
Music Video Kit involves a fair bit of disk-swapping to load in the actors etc and it would have been nice to have had the option to use two drives, but this is a minor criticism of a very good program.

If you're at all interested in doing something just for fun (and that's why I bought my 64 in the first place!) then have look at this one. I think you'll like it.

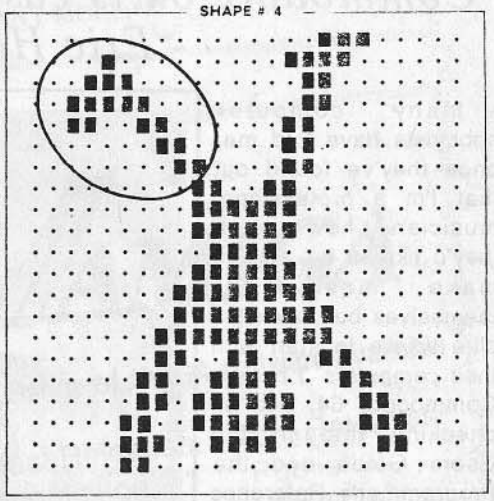
Music Video Kit is distributed in Australia by OziSoft, (02) 211 1266.

Drawing an actor is accomplished in much the same way cartoon animators make separate drawings for different positions. Then by rapidly sequencing through the drawings, the effect of motion, or animation, is achieved.

By turning on pixels, draw shape as shown



Here's where the magic of the actor editor is used to easily create a cartwheel. To turn the actor on his hands, press V and alter the highlighted pixels in his left leg as shown



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The Music Processor

Making manic melodies on your Commodore 64 is easy with this package
- Eric Holroyd

Many computer hobbyists have told me, once they've found out that I'm a professional musician, how much they'd like to be able to make music for themselves but haven't a clue where to start with their computers. I have a Commodore 64, and on checking through the Users Guide and the Programmer's Reference Guide I agree that the prospect of all those endless pokes to make just a few notes play is somewhat daunting.

I've had my 64 for a couple of years now and have been experimenting with all the wonderful things that it can do, like printing out graphics from my touch-pad input, storing lists of interesting magazine articles for quick reference, word processing for my letters etc, but it's only recently that I've got around to playing music on the machine and I have to tell you, not only is it very easy to do, it's great fun too! That is, if you have a program called *Music Processor.*

This excellent piece of software must have been designed with the beginner musician in mind and has a lot of features to make playing music on the C-64 very easy. It's menu driven with various functions: In one you can play the keys of the 64 like a piano, and there's even a small keyboard available which fits directly on top of the keys of the 64 to make it even easier. This is called, naturally enough the "Incredible Musical Keyboard" and comes with a book of music you can get down to playing straight off.

You can "record" what you play into the 64's memory and save it to another disk if you like it, too. In addition to this, you can load up snazzy accompaniments to play along with and they're very easy to work with.

In Jukebox mode you can play a range of tunes from *Music Processor*'s menu and it has some good visuals on the screen whilst the music is playing. There's a Random Music mode that plays an endless stream of notes which are quite pleasant, and whilst listening to the random stuff you can change the Preset sound and instruments of the three voices with which *Music Processor* works. This way you can quickly learn about the 99 different presets (which you can alter to suit your own taste too) and if you make notes about the effects you like best you can then use those by number in your own tunes and pieces. The Presets and Special Effects are available in Piano mode too. Great stuff!

Once you've played around with it and heard the variety of music it'll do, mucked around with the presets and Special Effects and generally "got to know" the program, you'll be ready to use the real power of *Music Processor* and start to create your very own music. You do this in the extremely versatile Edit Mode and if you follow the examples in the easy-to-read manual you'll be up and running very quickly.

You can choose to enter the notes of your tune in "Actual Time" by playing the tune in the Record mode and then saving it OR you can type the note names in from the keyboard in the program's own code (which is complete with Auto line-numbering) OR you can use your joystick in what's called the Stepmode to position your notes on music lines on the screen and even copy music directly from a song sheet or other music!

Personally I like the third option best and find it really easy to use. The note plays as you enter it with the joystick and it's pretty foolproof (that's probably why it works okay for me!) but I've spoken to other people who use the program who prefer one of the other two options. All I can say is that it's great to have the choice of three methods which all work well.

As you enter your music, or even after you've completed it, you can edit the listing (*Music Processor* writes its own program of commands which you can change at will), add to it with extra Instructions and much more. You can even add the words of your song and have a "watch the bouncing ball" feature running whilst it all plays. Marvellous!

For advanced programmers there's a guide to memory locations used etc in case they (clever people that they are) want to add extra graphics and effects of their own.

There's no need for the rest of us to learn programming to add super graphics though, as there's another program in the suite called *Music Video Kit* which lets you create animated graphics with a seemingly endless supply of "actors", "backdrops", "scenery" etc etc from within that program and you can put the music you've just created into a Music Video you create yourself too. See the

review in this issue. Meanwhile, back to the *Music Processor*.

Whilst you're entering your music you'll enjoy a very handy feature which takes care of musical repeats. Much music has passages which are played again and again at various points through the piece and the program lets you Append that section which is to be repeated to what's in memory. This saves a lot of inputting and makes the job pretty quick, too.

In the manual there's a nice introduction to the 64's SID chip. This is the chip containing the three synthesizers (the Voices), a sound-filtering system plus some other special features.You'll learn painlessly about Waveforms and Attack/Decay/Sustain/ Release envelopes, referred to as ADSR, in magazine articles which I'm now beginning to understand, and lots of other information but only if you want to learn it. You don't need to know any of this stuff to be able to work the program. Once having learned what the manual tells you about the sound chip you'll probably be as intrigued as I am to learn a bit more synthesizers and you'll be glad to know then of other programs in the suite, which is published by the American software company Sight & Sound.

3001, A Sound Odyssey, a fun synthesizer tutorial

Kawasake Synthesizer, which lets you Compose or Perform synthesized music

Kawasaki Rhythm Rocker, great graphics and "play-along" music synthesis.

These other programs are all complementary to *Music Processor* and you'd have to ask at your computer shop for the others in the range (believe it or not there are others!) The main point of all this is that computer music is fun and even someone who's never had anything to do with the subject before can be playing music on the 64 very quickly with this excellent program. I heartily recommend it.

NB: Music Processor is distributed by Ozi Soft and sells for $49.95.

MODIFIER (LENGTH)	TYPES OF NOTES	RESTS (R)
W	Whole Note	
H	Half Note	
Q	Quarter Note	
E	Eighth Note	
S	Sixteenth Note	
T	Thirty-second Note	
.	Dotted Note (increases duration by 1/2)	

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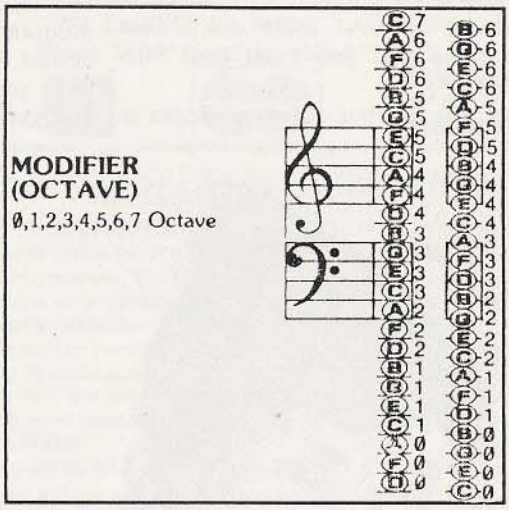

The Incredible Musical Keyboard

The 1541 Revisited

Over the number of years that the old faithful 1541 has been knocking around, (I remember the time when it was the pride of Commodore) there have been a number of nasty rumours circulated.

It is true that the 1541 is slow, and has a habit of bashing its head out of alignment. Apart from these two problems it's quite a powerful little device. Maybe not able to handle a CRAY system, but still rather good of its own kind.

There have been many articles written about the 1541; some were correct and some were not. So now I'm going to have my two cents' worth.

SAVE WITH REPLACE

The SAVE WITH REPLACE command has come under a lot of flack. And frankly those of you who have had trouble using the command, have no one to blame but yourselves. That may sound a bit harsh, but it's true.

There is no problem with the DOS command, however there are a few precautions that you must take into account.

The way that this command works is like this. Firstly the drive will save your new version of the program to disk. Then it changes a few bytes on your directory sector (ie. track 18 sector 1). The change to the directory simply points to the new tracks that the modified version was saved on.

What all of this means is that if you SAVE WITH REPLACE a program that is 40 blocks in size, you have to have 40 blocks free on the disk. It should also be noted that you have to include the drive number, after the @ symbol, if you want the command to work right, ie. SAVE"@0:filename",8

STARed files

I've had a few questions asked about STARed files, those are the files which are shown as *PRG on the directory.

These types of files, and I say files because it could happen to SEQ, PRG, or USR files, are rather nasty things. What has happened in these cases is this; the program or access file has not been closed. It's quite a common sight to see once you start using user files, but not too common with program files. Mostly because the 1541 DOS always closes a program file under normal conditions. So obviously if you have a starred file, that means you don't have a normal condition.

And what should you do if you have suffered this?

Well, the first thing you should do is Validate the disk, these files are time bombs just waiting to blow your disk into lots of little chunks. Then get rid of the file any way you can. Try Scratching it first. That method will most likely not work.

That leaves you with only one option, copy all of the working files onto a 'junk' disk. Format the disk which has the wrecked file, then recopy the working files from the junk disk to the newly formatted disk.

Now for a word of warning concerning the 1541 and the SX-64 drive.

Many of you may very well know that the older Commodore drives, like the dual 4040, have a slightly different format from the new ones. This one byte change means that disks from a 1541 are read compatible with the 4040 disks, but not write compatible. The bad news is this, although the SX-64 is meant to be fully compatible with the C64 and C64c, the SX-64 drive formats like the old 4040. Why Commodore chose to do this is beyond me, and most people.

The last small error that I'll mention is about the bytes written to a disk during a New.

All of the disk drives before the 1541 used to format the disk using '00' to fill in the disk. The DOS that the old 1541 has, writes '4B' followed by a string of '01' bytes. This flaw in compatiblity doesn't affect any operations at all. In fact it's handy for checking to see if the disk was formatted on an old 1541. If you want to check to see if you have one of these old DOSs, then just grab a sector editor and take a look at a newly formatted disk.

Amiga Column

by Tim Strachan

Plenty is happening on the Amiga front these days, and some of us are running to catch up. This month I'll write about Public Domain software available for the Amiga, Alerts or Guru Meditations, and various other bits and pieces of interest to the Amiga user.

Public Domain software

Amongst the resources available to PC users, but often neglected because of inaccessibility or ignorance of its existence, is the large store of Public Domain (PD) programs. Veteran users of established computers, like the C64 or Apple II or IBM, have profited greatly from this low-cost but often high-quality software source. And since its introduction in late '85 the Amiga has stimulated a large quantity of PD software of very high quality. In its various forms, the quantity must be getting on towards 100 disks full.

WHERE?

The sources are many and varied:

● From the start, Fred Fish (sic) in the US has made it his task to collate the best of the PD on his "Fish Disks", also known as Amiga Library Disks. At this writing, these number about 60, and are in more or less chronological order. As a result, the later ones tend to have more sophisticated programs as the Amiga juggernaut moves on, and the whole series is something of a history of development on the Amiga, with updated versions of previous programs coming out regularly. They are a must for any user, and cover the whole spectrum of applications, including Utilities, Tutorials, demo commercial programs, graphics and animations, communications programs, and so on.

As an example, I have collected two disks full of PD communications programs of every possible variety, including one that speaks to me. To get the best use from them, you need to be able to use the CLI, at least the most common commands.

● Other groups have put together their own compilations from the Fish Disks and other sources, such as Bulletin Board Services and User Groups. Such a group is Casa Amiga in the US, and likewise a couple of large user groups such as the Amiga User Group 68000. In Australia, MEGADISC (see ad this issue) has put together a number of "Theme Disks" with full explanations for use, sometimes missing in the original form.

● If you stalk the phone lines, you'll know that good BBS's, particularly in the US, encourage PD submissions, and members can download these for free. Care has to be taken while doing so to ensure that the transmission is clean and no "padding" (added characters) sneak in and make the download inoperable. There are a number of PD utilities which can be used to tidy up downloaded software. The Australian BBS's mentoined in Megadisc 2nd issue also have quite a lot of good stuff, at a much cheaper rate than getting it from the States.

WHY?

The reason there is such a lot of PD software is that there are a lot of talented enthusiasts out there, who create programs for practice or as part of a longer-term commercial project or just for the hell of it. And as there exists a certain camaraderie amongst users, and a desire to show what they've done either for the kudos or to prevent others re-inventing what's been done, they make their work available. It may also be that their program may not be quite up to commercial quality, or they may not be interested in the hassles involved in selling what they've done.

Some provide what they call "Freeware" - i.e., others can do anything they like with it, modify it, use it in their own programs, pass it on, etc. Others provide "Shareware", meaning that while they retain the copyright, you can use it for your own purposes, but are morally obliged to send some small donation for using it regularly. (All this is quite distinct from "vapourware" which is a commercial product being released "Real Soon Now...").

Generally speaking, it's well worth getting your hands on a lot of this stuff, whether you're a serious programmer or a curious browser. And I'd also recommend that you support the generous programmers who make their work available, by sending a small donation, They appreciate it, and feel more inclined to keep up the good work.

SOME EXAMPLES OF PUBLIC DOMAIN SOFTWARE

The samples below will give an idea of the variety available:

Fish 53 -
Animations: 3 good ones with a "Player"
Fish 52 -
Fractal: produces mathematical landscapes
VDraw.19: a good drawing program (not quite DPaint)
Fish 50 -
Includes a Communications program, a 3-D AmigaBasic game, an improved CLI, a sound editor with demo sounds, and a graphics demo program.
Fish 47 - The famous Juggler Ray-Trace animation, the Robot Arm graphic demo, and another communications program.

Secrets of the "TYPE" command

TYPE is a most versatile command in the CLI (Command Line Interface), and can be used to great advantage in sorting out the types of files that you may be confronted with on Public Domain directories and elsewhere.

The normal use of TYPE is simply to print a file on the screen, normally text (ASCII characters). So at the CLI prompt, just enter

> Type filename

and you'll see the screen fill with text and it'll scroll by rapidly. To halt this process, simply hit a key, say the Space bar. To continue, hit any other key. And to quit the file display, hit CTRL-C, then RETURN.

To print a file your printer, simply enter

> Type filename to prt:

having made sure your printer is on and loaded with paper.

To get a file displayed on screen with line numbers down the left hand side (useful when programming, or checking the length of a file), enter

> type file name opt n

or to get the same to your printer

> type filename to prt: opt n

Now, say you've found a program somewhere with no documentation or file extension (like filename.c) or anything else to indicate what it is, or what state it is in. That is, it may have been downloaded from a BBS untidily, and doesn't work at all, and perhaps even hangs the machine if entered in the CLI. But you have to know what it is! and perhaps even resuscitate it. Enter

>Type filename opt h

and you will get what is called a "Hex dump" of the file, which means that the file will be displayed on screen as a number of rows of hexadecimal numbers on the left side, and its text equivalent on the right (if there is a text equivalent - it might be all code). E.g. -

0000: 000003F3 00000000 00000000 00000000 .....

and so on for any number of rows, depending on the size of the file. In this case, the "000003F3" indicates a "Hunkheader", i.e., the start of an executable program. So the problem could well be that the program still has some extra characters attached as padding while it was downloaded. There are Public Domain programs called FIXOBJ and CHOP which are designed to strip extra characters from programs.

If you saw "000003E7"at the start of the hexdump, you'd know you had an OBJECT FILE, i.e. the output of a language compiler.

Another problem is that a text file from a non-Amiga source may have extraneous characters embedded. The Amiga uses only LINEFEEDS to move to the next line, and the hex for this is "OA", which you'll see at regular intervals in the hexdump. If you see "ODOA" recurring you'll know that you have Carriage-Returns (OD) followed by LineFeeds (the system used by IBM PC's) and this will cerainly cause problems. The utilities "RemCr" and STRIP both knock out the OD characters, thereby fixing the problem.

Similarly a text file downloaded from a Macintosh will have only Carriage Returns (OD). The "13 to 10" utility will replace the OD (decimal 13) with OA (decimal 10).

A bit of experimenting will soon familiarise you with these processes, and you might find it worth your while to get some of the Utilities mentioned, MEGADISC will organise these or any other Public Domain programs for you - look for the ad in this issue.

Alerts, Traps and Sad Meditations

Every Amiga user has been confronted from time to time with Guru Meditations erupting in the middle of smooth session, complete with diabolical red and black flashes and an arcane string of numbers, which seem to imply that the machine at least had some idea of what went wrong. And so it did, for there is a method in the apparent madness. In fact, if you're interested, you can get a pretty good idea of what went wrong, if you understand the coding of the numbers.

The technical name for these occurrences is ALERTS, which are of two types:

1. An alert caused by a 68000 'exception' or 'trap' occurring as a result of an illegal instruction in the program being run. The program can intercept this trap by inserting its own 'trap handler' to perform some other function, but usually you will get a "Task held" requestor leading to a Guru.

These traps are part of the 68000 chip, and are not assigned by the system software (ROM Kernel) like the other type of Alert. If you're a software developer you can find abstruse descriptions of the numbers in the Developers' manuals, but the average user will hardly be enlightened by an exhaustive list here. Briefly, however, if for example you get Guru Meditation #00000003.000027D2, the number before the dot is the 68000 Trap Number, and possible numbers are:

2.....Bus error (hardware)
3.....Address error (often happens - word access on an odd byte boundary)
4.....Illegal instruction (out of control!)
5.....Program has divided by zero
6.....CHK instruction
7.....TRAPV instruction
8.....Privilege violation, i.e., attempt to use supervisor mode
9.....Trace
10...Opcode 1010 emulation (out of control)
11...Opcode 1111 emulation (likewisel)
32-47. TRAP instructions

The number after the dot is the address of the task control block for the task that went wrong, probably yours, and it allows you to go in and debug your program with the ROMWACK utility.

2. The second type of Alert occurs in the wake of a System Software error, and can be either "recoverable" or a "dead-end" alert. However, with the current system, recoverable just isn't. Once again there is a code which allows you to find out why the crash occurred, if you're really interested.

First two digits: Subsystem number - tells you which system module erred and the codes are:

Exec library 01
Console device 11
Graphics library 02
Gameport device 11

AMIGA COLUMN

Layers library 03
Keyboard device 13
Intuition library 04
Trackdisk device 14
Math library 05
Timer device 15
Clist library 06
CIA resource 20
AmigaDOS 07
Disk resource 21
RAM handler 08
Misc resource 22
I cons library 09
Bootstrap 30
Audio device 10
Workbench 31

Next two digits: Specific error code - can be useful to inform about missing libraries or device drivers:

Insufficient Memory 01
Open Device Driver 04
Make Library error 02
Open Resource error 05
Open Library error 03
I/O error 06

Next four digits: Specific error codes - its meaning depends on the source of the error in the first two digits (See Appendix D-18 of the ROM Kernel manual Volume 2).

Digits after the dot: gives the Task address, i.e. the address in RAM of the task that was running when the error occurred. Indicates which of the many programs running in the Amiga caused the problen.

An example of using this precious knowledge -

Not enough memory. Press left mouse button to continue.
Guru Meditation
#02010009.0007D6B8

This says "A recoverable (not really) error from the graphics library (02), no memory (01), no memory for TmpRas (specific error 0009), at address 7D6B8."

I hope that is of some use - enthusiasts can find more information in the ROM Kernel manuals, and average users can say "Well, what about that. . ."

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Arcade Action

by John Hatchman

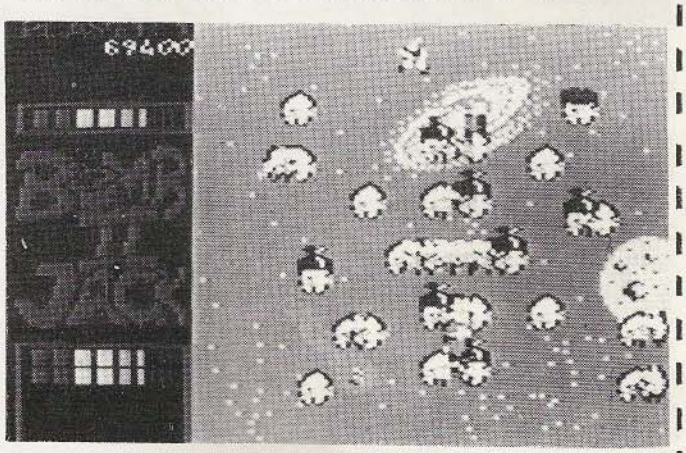
Yawn! Well, hi there people, it's that time of the month again and I'm back to give you the rapp for the latest arcade conversions and releases that are now becoming available. As you know, the new Amiga is on its way out and I think that it will make a giant impact on the computer market. What a miserable day it is today, and I'm in the mood to give the gab on the new games.

Tenth Frame

First of all, this month has quite a bit of new released software available or slowly becoming available. Starting off this month's games will be *Tenth Frame*, which is a ten pin bowling game from the makers of *Leaderboard*. It has all the makes of a top ten killer. Onscreen appearance shows your score at the top, five lanes below (the middle one is yours of course), and the familiar power box, which was common on *Leaderboard* (speed and hook). Look out for this price pulling, spin bowling creation.

Bomb Jack II

Another of the hot releases for this month is *Bomb Jack II*, from Elite. The game has the same principal as the first, but it has all new graphics and sound. Elite have said that the patterns will all look different, leaving the gameplay the same. Keep an eye out for that one to arrive soon.

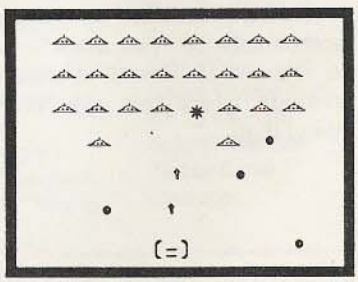


West Bank

Gremlin Graphics have released the ancient arcade game *West Bank*. It won quite a following on the Spectrum. The idea of the game is to blow away the baddies as they walk through one of the three doors. Just be careful not to blow away the bank's customers.

Supersprint III

Supersprint III is a 2D, top view racing car game. You can play with up to three players on the one track. Two other conversions that have just been licenced are the System One hits, *Road Runner* and *Indiana Jones*. Not much has been passed around so far, so more about that next month.



Don't miss out on these great bargains!

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Features:

Forest Raiders - Full machine code shoot 'em up

Machine code paint, border, input and flash routines

Nice Lister - for readable listings on non-Commodore printers.

Recover II - for recovering deleted files, and a catalog program - for getting a disk directory without losing your program

And More...

Disk Magazine Two

Features:

Programs demonstrating 3D graphic plots

A terminal program called Teleport

A tutorial on bits and bytes

Character editor - for designing your own custom alphabets and graphics

A full demonstration of Electronic Card File

And More...

Disk Magazine Three

Programs:

Hangman	Labyrinth
Calendar	Finance
Typing Practice	Roadblock
Bird Invaders	

Features:

Constructabrix - education and graphic construction program for younger users

And More...

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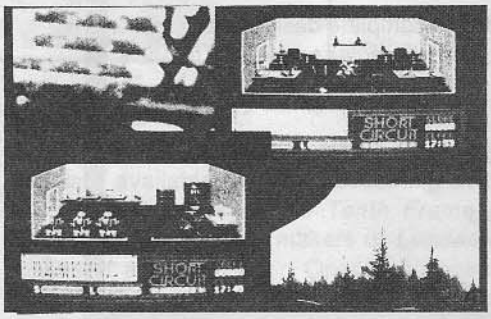
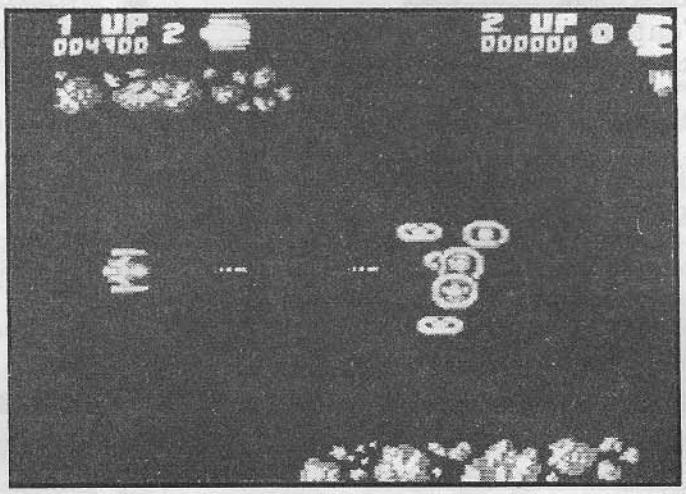
Short Circuit

Next on the hit list will be *Short Circuit.* The game is to be played in two parts. It is is based around a robot who has been created in a factory and has grown rather intelligent. This intrigues the makers enough to try and pull him apart. It starts off with No 5 trying to find the correct items to create a decoy robot to fool his creators. Part two however is not as easy. No 5 then has to flee across the country to freedom, avoiding the security forces sent to follow him and also avoiding the animals of the dark forests. Good luck, No 5! Hope you do well in the buyers' eyes.





Delta

The latest arrival from Thamalus is *Delta.* This is a left to right shoot-em-up, which has all the elements of a fine arcade game. This game has a whopping 32 weird and wonderful screens to blast through. All the music is written and created by Rob Hubbard.

Well, time's running short and it's time to mosey on out of my little office now to mingle with the night life. So enjoy this month's *Commodore Review* and have a great time reading it.

Arrivederci!

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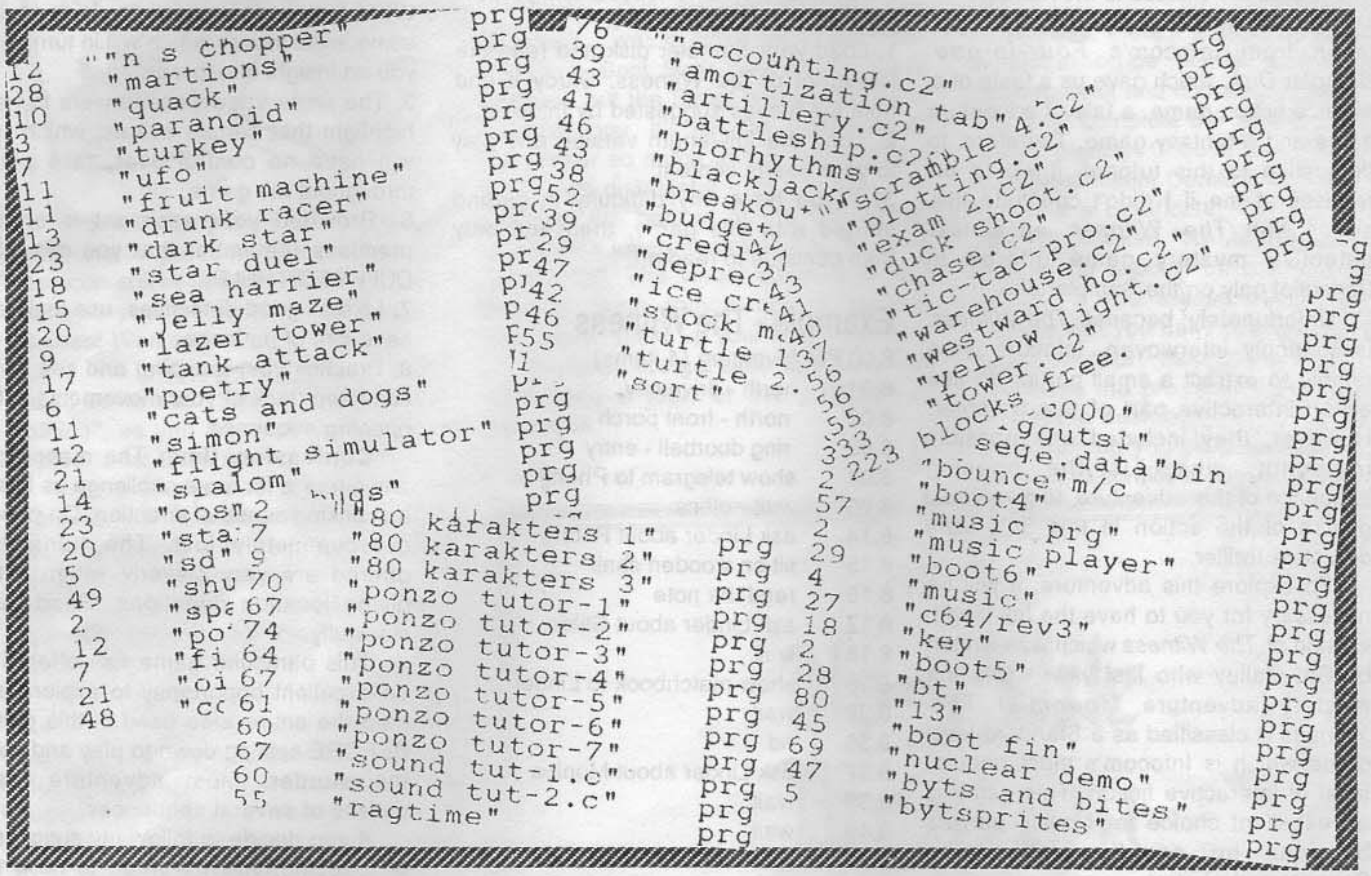

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Infocom Four-in-One Sampler part five

by J A Salt

Everybody enjoys a good murder mystery! But how often do you get the chance to play a super sleuth detective who is also the witness to the murder?

To date we have looked at excerpts taken from Infocom's *Four-in-one Sampler Disk*, which gave us a taste of a science fiction game, a tale of adventure game and a fantasy game. Therefore, to do justice to this tutorial, it would be remisss of me if I didn't conclude this series with *The Witness*, an all-text detective mystery game offered in transcript only on the Sampler disk.

Unfortunately, because *The Witness* is so richly interwoven, Infocom were unable to extract a small portion to use as an interactive part of this Sampler. However, they included one possible transcript, which is the opening sequence of this adventure, to give you a glimse of the action in this 30's style detective thriller.

To explore this adventure, it will be necessary for you to have the full-length version of *The Witness* which was written by Stu Galley who last year wrote the mystery adventure *Moonmist*. *The Witness* is classified as a Standard level game which is Infocom's most popular level of interactive fiction. This game is an excellent choice for Novice players but can be equally enjoyed by Experienced players.

Having played and completed this game I too have decided to use the opening sequence for our exercise.

Let's play

"... In *The Witness*, you step into the shoes of a Chief Police Detective stationed in a quiet suburb situated outside L.A. It's February, 1938. You have just received a telegram from a Mr Linder stating that his life is in danger and requesting your help. His name "rings a bell" and you remember reading a police file on a Mrs Virginia Linder's recent suicide. Her suicide note and the newspaper clippings told you all about the family.

It's 8.00 pm - you get out of the taxi at the DRIVEWAY ENTRANCE and prepare youself to meet Mr Linder ..."

1. Load your Sampler disk and read the transcript of the Witness. Study it and note the moves suggested by Infocom.

2. Load the full-length version and play to your hearts content.

3. If you have any difficulty in getting started with this game, then and only then continue to read on.

Example - The Witness

8.00 PM	Inventory (4 items)
8.01	north - driveway
8.02	north - front porch
8.03	ring doorbell - entry
8.04	show telegram to Phong
8.05	wait - office
8.14	ask Linder about Phong
8.15	sit on wooden chair
8.16	read the note
8.17	ask Linder about Stiles
8.18	wait
8.28	show matchbook to Linder
8.29	wait
8.36	no
8.37	ask Linder about Monica
8.39	wait
8.49	wait
8.59	wait - LINDER IS DEAD
9.04	drop note, telegram and matchbook
9.05	stand up
9.06	press butler's button
9.07	east
9.08	open back door
9.09	ask Phong for keys
9.10	get keys
9.11	unlock back door and open it
9.12	east - office porch
9.13	wait
9.23	ASK DUFFY FOR HELP ...
(29	**moves/9.23 PM)**

You now have until 8.00 am to catch the murderer!

Let's look at the above moves

4. You may have realised that these are not the final moves for the segment. What I've endeavoured to do is to list some initial moves which will in turn, give you an insight into this game.

5. The times shown above were to help highlight that certain events, which you will have no control over, take place throughout the game.

6. Provided your assistant is on the premises remember that you can ASK DUFFY FOR HELP!

7. Like all good detectives, use logic and have lots of patience.

8. Practice your mapping and see if you can keep track of your movements in the opening sequence.

Confession time: The mapping of any game is for me a challenge as I have a shocking sense of direction. On paper I got completely lost. The transcripts offered are very cleverly witten when giving location directions. Read them clarefully.

This particular game has offered us an excellent opportunity to explore and map the entire area used in this game, BEFORE settling down to play and solve the murder. Most adventure maps consits of several sequences.

If you decide to follow my suggestion of mapping, you will need to have the keys of the house. Doors play an intricate part in this adventure.

Another PLUS for us in using the full-length game as part of this tutorial is the opportunity to look at the SAVE facitlity offered by Infocom for all of their adventures. (I'd have packed it in very early without the SAVE program).

How to SAVE and RESTORE

Read carefully the Interactive Fiction Reference Card provided in the packaging of your game.

A formatted blank disk is required before it can be used to SAVE your

story, so the routine I have is to take a working copy from my original disk and format the other side of this disk to use for SAVING. Remember to put a tab on your disk to protect the copy of your adventue. It is easy to get carried away and forget to turn over your disk. (Never share your working disk with any other game.)

I'm aware that many players never bother to SAVE, but believe me, it is the secret to successful adventure playing!

You may SAVE up to five different positions on your disk at any one time and RESTORE them in any order.

Each SAVE position is assigned a number from one to five. You must specify a position number each time you use the SAVE command and you overwrite any position previously saved with that number. You must use a different number for each position that you want to SAVE.

If you haven't attempted to SAVE before I suggest the following:

1. Load and explore the game until you "hit a brick wall" or need a coffee break etc. During this exploration put into practice the routines discussed in previous parts of this tutorial.

2. Type "SAVE 1" and follow the procedure shown on your screen.

3. At this point you have an option, you can check your notes and RESTART your game correcting any wrong moves you may have made on your first run through and type "SAVE 1" which will cancel out your first "SAVE 1", OR ...

4. You can RESTORE "SAVE 1" and continue to explore your game to a point where you decide to "SAVE 2", then "SAVE 3" etc.

5. At some stage you will "hit a brick wall" which will refuse to budge. It could be because you left behind some innocent looking object back in "SAVE 2" or you took a wrong turn back in "SAVE 3". Whatever, don't be discouraged. Save your moves (just to be safe) and RESTORE to "SAVE 2" to collect that cursed object, or RESTORE to "SAVE 3" and go in the correct direction.

Of course this means that you will have to replay your moves and RESAVE again but don't be discouraged, each time I have to do this I "spring clean" my moves.

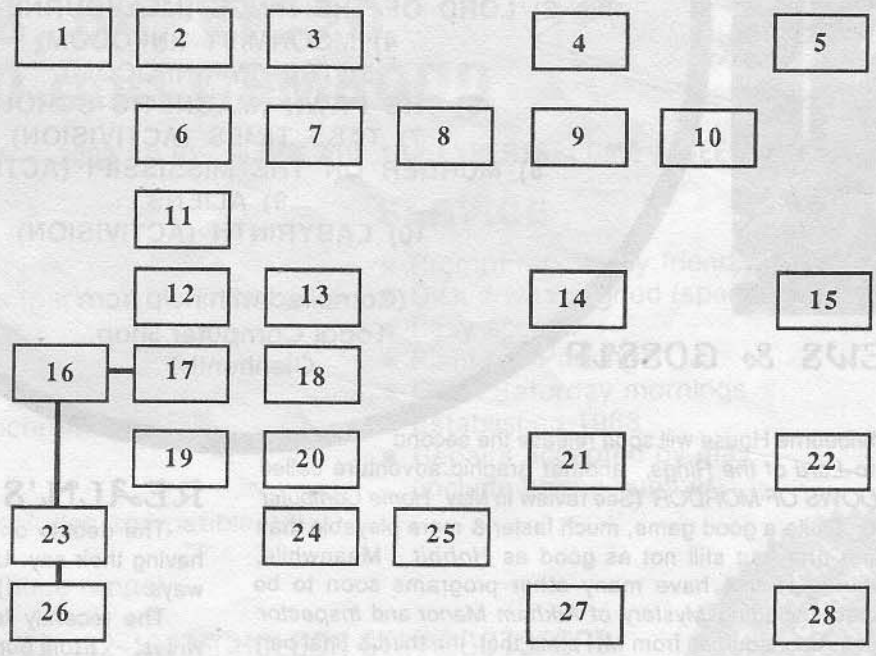
As in previous segments I have included a location map of *The Witness* showing boxes for all locations found in the full-length version, however, you will note that apart from the first four locations which I have identified, I have left it to you to track down and match up the locations listed with their respective numbers.

As this is the final part to this tutorial you will note that I have also omitted the direction guidelines which I would normally share with you. I hope you enjoy playing this adventure and have fun in completing this map for yourselves.

Happy Adventuring.

( ) Backyard
( ) Bathroom
( ) Butler's Bathroom
( ) Butler's Room
( ) Dining Room
(23) Driveway
(26) Driveway Entrance
(17) Entry
(16) Front Porch
( ) Front Yard
( ) Garage
( ) Hallway
( ) Hallway - middle
( ) Hallway - north end
( ) Hallway - south end
( ) Kitchen
( ) Linder's Bedroom
( ) Living Room
( ) Monica's Bedroom
( ) Office
( ) Office Path
( ) Office Porch
( ) Rock Garden
( ) Side Yard
( ) Storage Room
( ) Toilet
( ) Tub Room
( ) Workshop

Witness full-length map and location listing: Incomplete version created for Tutorial.



Object of mapping exercise is to identify each location numbered above and to draw in direction guidelines.

ADVENTURER'S REALM

by Michael Spiteri

Welcome once again to Adventurers' Realm, Australia's only adventure column dedicated to adventure games and the people who have a crack at them. More letters are coming in, (more without stamps!!). Please send all your mail to the following address, not to the main cave in Sydney.

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Things currently being developed in the Realm include a Help Team, a Telephone Hotline Service, and a Realm Database for quicker responses.

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1) LEATHER GODDESSES OF PHOBOS (INFOCOM)
2) HITCHHIKER'S GUIDE TO THE GALAXY (INFOCOM)
3) LORD OF THE RINGS (MELBOURNE HOUSE)
4) MOONMIST (INFOCOM)
5) TRINITY (INFOCOM)
6) THE PAWN (MAGNETIC SCROLLS)
7) TASS TIMES (ACTIVISION)
8) MURDER ON THE MISSISSIPI (ACTIVISION)
9) ALIENS
10) LABYRINTH (ACTIVISION)

(Compiled with help from Local Computer Shop, Glenhuntly)

NEWS & GOSSIP

Melbourne House will soon release the second part to *Lord of the Rings*, another graphic adventure called *SHADOWS OF MORDOR* (See review in May *Home Computer GEM*). Quite a good game, much faster & more playable than the first one, but still not as good as *Hobbit*. Meanwhile, Melbourne House have many other programs soon to be released, including *Mystery of Arkham Manor* and *Inspector Gadget*. Also, sources from MH state that the third & final part of *Lord of the Rings* is in its final programming stages!!!

Infocom, now back on two feet again with Activision, after the disastrous Cornerstone Project, have a few more games in the production stages. One close to release is *Bureaucracy*, a controversial game about battling the RED TAPE!!

On its way to Australia is the follow up to *The Pawn*. *The Guild of Thieves* is rumoured to be easier than *The Pawn*, with greater graphics. Currently in its production stages is *Upon Westminster Bridge*, a thrilling mystery - probably another winner for Magnetic Scrolls/Rainbird.

Activision are making thousands out of *Borrowed Time* and *Tass Times* (my favourite adventure!). Soon to be released in Australia is *Portal* !! More news when we get some...

Ozisoft have released the next part in the Adrian Mole series. Called *The Growing Pains of Adrian Mole*, it apparently follows closely to the book and its predecessor. You'll get a review when we get our copy to load ! !

CINEMAWARE have released a smashing program called *Defender of the Crown* on the Commodore Amiga. Features outstanding, spectacular, breathtaking, better than *Pawn*, animated graphics - just like watching a movie! Almost worth buying an Amiga for!

REALM'S DEBATE CENTRE

The debate on clues & tips continues, with more people having their say. Unfortunately, the debate seems to go both ways . . .

The recently formed Australian Adventure Masters club writes: "From our experience we have found that the majority don't like cryptic clues. After being stuck somewhere for a while all you don't need is another puzzle!!"

April & Alan Nowakowski, Elwood, Vic, also agree . . .

"We would also appreciate a straight answer as more frustration after the amount of effort we have already put in would ruin the game much more than a straight answer."

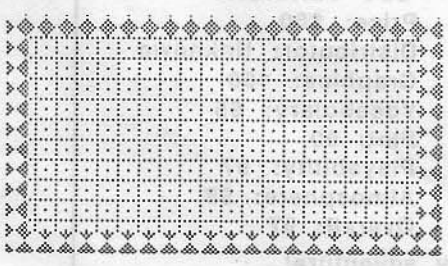
And Robin Colgrave of Bradbury, NSW prefers straight clues . . . "On the debate on how clues should be presented, I think the answers should be straight forward, not cryptic."

However, David Halliday of Bass Hill, NSW, fights for cryptic . . . "I think they should be cryptic, like Vivienne Slater & Heather Marshall stated, you feel slightly cheated reading complete solutions, but if you read cryptic ones, the answer is there, all you have to do is work it out!!" Back to square one.

And just when we had decided not to print complete solutions, The Australian Adventure Masters fight back with the following . . . "On the subject of complete solutions opinions seem to be divided (Mick: You don't say??) Part of the people think it will make things too easy while others think it's a good idea. Arguments are: Those who don't like solutions don't have to read them, on the other hand many would give their right arm to have the right tip at 1 am in the morning. All one has to do is not read the whole thing, but hints which are needed. It all boils down that nobody wants complete solutions at once but a majority would like to have it handy for when needed. Maybe printing solutions in code would be an answer."

BINGO!! So, what do people think of having complete solutions published, but in a cryptic fashion. As for hints and tips, the debate is still open, since both arguments match up quite evenly. The debate continues . . .

(Meanwhile, the debate in *Home Computer GEM* concerns the argument on GRAPHIC vs TEXT adventure games. If you wish to join in, label your letter GEM !!)



PROBLEMS, PROBLEMS, and more PROBLEMS ! !

Let's get the ball rolling, ZORKER OF THE MONTH **Philip Mayer** was also stuck in *Ballyhoo*, with the following problems:

1) How does he get the radio off the fat lady?
2) How does he get past Harry at the turnstile?
3) What does he do in the Lion's Cage? (Mike: I hope the lion hates ZORKERS!!). **4)** How does he get into the Elephants cage? (Do elephants like ZORKERS??)
5) What is the ladder for?
6) What does he do with the balloon?
7) How does he shift the famous plywood?

Meanwhile, famous debators **April & Alix Nowakoski** are stuck in *Leather Goddesses of Phobos*. Many others asked the same question: "How do you get past the %$#&% ion machine? "

Mr. S Porter of Eltham, Vic, is stuck in a few adventure games: *Sherlock*: How do you catch up with Basil after losing him at the Old Mill Road? *Valkerie 17*: How do you climb up the mountain after the diamond is stolen?

Meanwhile, a dude called **Gunars Berzins** from Yagoona, NSW, sent me a whole host of problems with solutions beyond me !!

Underworld of Kyn: How do you climb the rope that is hanging from the roof? How do you get to the control bubble?

Rebel Planet: Is it possible to escape from the cell? How do you use the phone booth?

Classic Adventure: What source of light can be taken into the small chamber? Where is the bear?

Kentilla: Where is the gold key?

Necris Dome: How do you disable the battle droid? *ZZZzzz*: How do you stop the bus?

George Axam of Wynnum is stuck in *African Safari*. Where can he get the paddle to enter the boat?

Chris Robb, Boronia, Vic wants to know how to pass the boulder in *Catacombs*. Any takers ? ?

Mr R.W.Robinson is having a fight with Beyond's *Lords of Midnight* disk. He asks if any reader has been able to SAVE the prog on the disk version? If so, what title-I.D do you give the data disk?

CLUB UPDATE

I've already mentioned a club called the Australian Adventure Masters. If you'd like to join, membership is free. I couldn't make out the address, so try phoning (09) 279 4460.

Quite a while back, Karla Slack of Springwood, NSW, sent me a list of English adventure clubs. These are as follows:

ORCSBANE, 84 Kendal Road, Sheffield, UK.

ADVENTURERS CLUB, 64c Menelik Road, London NW2 3RH

Know of any adventure/strategy/playbymail etc clubs? Tell us about them!!

ADVENTURER'S REALM

ZORKER OF THE MONTH

Philip Mayer of Glen Innes, NSW 2370 is this month's typical Zorker. Who had the cheek to send me 5, yes five! problems on *Zork III*. Arrggghhhhh!!! As well as two *Zork II* problems. What ever happened to all of the nice and simple *Zork I* problems people used to write in for?

Has *Zork I* finally been mastered by the Universe ? ? ?

SOLUTIONS TO MANY PROBLEMS

Hobbit: The side door of the Lonely Mountain can be opened using the small curious key found in the Goblin's Dungeon.

Castle of Terror: Examine barrel near mill for flint. To get into castle, examiine ladder to find the locking pin.

(Above tips were supplied by **S. Porter**)

Planetfall: The microbe doesn't want you, it wants something else you are carrying.

Zork II: Break the beam to open the mirror.

Masquerade: Don't eat the popcorn - look in it!!

Enchanter: Drop all and enter gallery.

(Above tips supplied by **Craig Shepherd**, Cobar, NSW)

Worm in Paradise (for **Steven Suthers**): The valve can be found at the 'seedy hardware house'. Colour code: brown,blue,orange,orange,read,white,back. However, first you must go to the Job Centre. Colour code: red, violet, green, brown, black, violet, brown and get a job card for a LABOURER. It must be between 3 and 5. Then you must go to the Workplace, take control of the Waldroid and then go to the Hardware House. Also, when travelling on the "EDEN TRANSPORT SYSTEM", say EXIT to go to the nearest exit and JUMP to go to the centre of the system. When in your habidome, say BED to get the bed and say ON to watch TV. Say HOME to open areas to get to your habidome.

(Tips supplied by **Bryan Roberts**, Eden Hill, WA) .

THE PAWN

(Magnetic Scrolls / Rainbird)

For Commodore 64 and Amiga.

What's there to know about *The Pawn* that most of you don't know already? The game features outstanding graphics on both the C64 and the Amiga. The text descriptions are very detailed and fun to read.

The command parser on the Amiga is completely mindblowing, allowing complex sentences to pass through without any problems. On the C64, however, we have a different situation, with the command parser and vocabulary not up to such a high standard as set by Infocom. Many words were misunderstood by the game, however it was still quite good, and easily rates in the Top 2.

The graphics are very detailed, like oil paintings, using all the colour features of both machines. The graphics appear at most locations. On your second visit a small version of the graphic is displayed in the corner. The graphic screens can easily be manipulated using the function keys. The Amiga version features great voice synthesis, as well as the option to change the character size. The standard printout and load/save options are also fully operational. What about the game itself?

The Pawn is set in the magical world of Kerovnia "during a period of tremendous social upheaval." Apparently, a dude called King Erik is losing faith & support from his people, and he is slowly going downhill. This is mainly because the King's "refusal to reinstate the citizenship of the Roobikyoub dwarfs who were banished en masse soon after the assasination of the beloved Queen Jendah II." So, King Erik is facing hard times, which will becomind even harder if an election takes place.

This is where the player arrives on the scene. The actual goal of the game becomes clear as you plod your way through this mysterious land. Quite an ingenious but highly unoriginal plot (ie:*Twin Kingdom Valley*). Still, it makes way for a very powerful adventure game.

The documentation in the game is great. A little novelette is provided telling the story of Kerovnia. It is very humorous and highly entertaining!! Also supplied is a gameplay guide with a summary of the plot and a description of the parsar. Another little manual is enclosed describing how the game operates on the specified machine.

The graphics loads very quickly, and as before, can be turned off if need be.

Packaging is excellent. I simply would not hesitate in recommending this game to any adventure freako!!

AMIGA VERSION	C64 VERSION
Price: $80	Price: $60
Distributor: OZISOFT	Distributor: Unknown
Graphics: 98	Graphics: 100
Vocabulary: 99	Vocabulary: 95
P{lot: 90	Plot: 90
Playability: 98	Playability: 97
Atmosphere: 98	Atmosphere: 98
Overall:98	Overall: 97

Verdict: Quite a revolutionary adventure!

Commodore 128 Bank-Switching

Neville Duguid shows beginners how to adjust from 64 mode to 128 mode Machine Language programming environment.

Do you still GO64 for your Machine Language sessions, intimidated by the 128's bank-switching? It is possible to write 128 Mode programs without bank-switching of course. But things can get so crowded, it seems more like Vic-20 Mode.

Take heart. If you can make a C64 do things in machine language, here's all the clues you'll need to take charge of your 128.

First of all, what is Bank Switching?

In the case of the Commodore 128, Bank Switching is a way of giving the 8502 (or Z-80) microprocessor access to more memory than it was designed to handle.

Limited by its 16 address lines, the processor currently in control - the 8502 in 128 Mode - can directly access only 64K different memory locations. In order to make more memory available, the C128's memory chips have been arranged in "banks" which share the same addresses.

This is where the Memory Management Unit (MMU) comes in. It has control of which memory chips are able to respond when addressed by the MPU. In effect, it can make individual memory chips 'visible' or 'invisible' to the 8502.

One of the MMU's control registers, the only one we need worry about, is the Memory Configuration Register (MCR). By setting and resetting various bits in this register, the program can 'bank' whole memory chips in and out of the processor's address space.

To prevent vital bank-switching facilities switching themselves out, there are two 'holes' in the memory map which are common to all banks. One of these, at $FF00, contains a working image of the MCR.

Access to $FF00 is all that is required to select any of 256 different memory configurations.

To ease the programmer's plight in juggling all that memory, the 128's operating system provides a table of sixteen standard configurations, officially known by their "bank numbers", 0-15.

The Kernal uses the bank numbers to look up a table of Configuration Register settings at $F7F0. Provided Kernal ROM is "in context" - ie, visible within the current configuration - a call to GETCFG ($FF6B) can obtain the MCR setting for you.

You could reconfigure the machine to Bank 14, for example, by including the following instructions in your code. (Execution times in cycles are shown in brackets to the right):

```
LDX #$0E        ;nominate Bank -14
JSR $FF6B       ;GETCFG
STA $FF00       ; switch to it   (25)
```

It is equivalent to:

```
LDX #$0E        ;nominate Bank 14
LDA $F7F0,X     ;look up MCR setting
STA $FF00       ;switch to it   (10)
```

In a bank where Kernal ROM is not visible, a quick way out is to look up the Configuration Register setting yourself and insert it directly into your code:

```
LDA #$01        ;CFG value, Bank 14
STA $FF00       ;switch to it  (6)
```

There's an even faster way:

```
STA $FF03       ;Bank 14, you're in it
                (4)
```

The hole in memory at $FF00 is actually five bytes high. The other four addresses $FF01-$FF04 contain LCR's ("Load Configuration Registers"), and that's exactly what they do. They are not registers in their own right so much as triggers. Any write to their address, regardless of the value written, forces the loading of a pre-set value into the MCR.

Although the LCRs can be re-programmed, it is probably wiser to use their current settings until you've become accustomed to the 128 environment.

Table 1 shows the "official", "direct" and "hardware" methods for accessing the five most popular configurations. Banks 2 to 13, not shown, make provision for cartridges and memory chips not installed in current 128s.

There are only four LCRs. The Kernal, with its obligation to treat all banks equally, does not use them at all.

Since there is often an 8502 register already holding a zero, we can almost treat $FF00 as the LCR for Bank 15. This reduces bank-switching overhead and avoids some of the pitfalls associated with more exotic configurations.

Two areas of memory remain unaffected by the MCR and are thus common to all banks. We have already discovered the 'hole' at $FF00-$FF04. The other common area, $0000-$03FF, corresponds to the bottom 1K of memory. It contains RAM that will always remain "in context" regardless of the MCR setting.

Restricting our attention to the Banks shown in Table 2, we have available a number of 'less common' areas. Since there is no ROM at $0400-$3FFF, RAM-0 in that range is shared with Banks 14 and 15. (I'll call it "System RAM" to distinguish it from the universal "Common RAM" at $0002-$03FF).

The MMU automatically banks out the ROMs during writes to memory, so even when Bank 14 is selected, Bank 0 replaces it during any write cycles. Bank 15 is similar to Bank 14 except that the

I/O chip registers and 'Colour Memory' replace both RAM and ROM at $D000-$DFFF.

It is also possible to create an illusion of common memory by copying identical code to the same address in more than one bank.

The Kernal copies its interrupt vectors ($FFFA-$FFFF) and their target routines ($FF05-$FF47) into both RAM-0 and RAM-1. These routines are then able to reconfigure the System Bank when an interrupt catches the computer with the Kernal switched out.

A hazard occurs when a bank not listed in Table 1 inserts a ROM-chip or empty socket into memory at the Kernal's address. Unless the chip contains code to service the interrupts, the computer is liable to crash in an alien setting. (That is why the 128's built-in MONITOR always disables IRQs when examining memory - it can be called upon to look in any bank. BASIC, whose data is normally stored in Banks 0 and 1, doesn't bother with this precaution).

Another problem with the Kernal's way is that Kernal ROM is not itself in common memory. The Kernal's bank-switching routines, though located in RAM, need access to Kernal ROM before they switch to their target bank.

Whether you use the Kernal's indirect routines or not, they can teach you a lot about bank-switching. Although usually listed under their Jump table entries ($FF6E-$FF7A), you will find them in Common RAM between $02A2 and $02FF.

BASIC also has bank-switching routines in Common RAM ($0380 - $03D1), including CHRGET which fetches from Bank-0. Unlike the Kernal's routines, they use the LCRs and automatically return the machine to Bank 14 or 14A - the BASIC ROM's "Home" environment.

Finally, right near the top of Common RAM, at $03E4, are 11 bytes of free memory - just enough to write a bank-switching routine of your own.

Don't confuse the BASIC ROM's operating environment with the purpose of its own 'BANK' statement. 'BANK' nominated a current bank for SYS, PEEK, POKE and WAIT. It does not switch banks. (The interpreter could vanish from the current configuration if it did.) Rather, it provides an answer to commands like POKE which need to know: "What bank?"

The default Bank for this purpose is Bank 15. Thus the System Bank is what you see when you SYS and PEEK the 128 in its default condition. You don't need to use 'BANK' at all if you confine your attention to Bank 15. But if you BANK0 to PEEK 'under' the ROM, you will need to BANK15 before you can hope to SYS ROM routines again.

The Kernal's SETBNK performs a similar service for file-based I/O. It provides a bank-number to go with SETNAM's address paramater, and can also specify the bank for future LOAD and SAVE operations. SETBNK deposits the relevant bank numbers at $C6 and $C7. The Kernal's SAVE, OPEN and CLOSE routines look there to find out which banks conceal their current files and file-names.

Before we take off for Bank 99, let's give some thought to the need for planning ahead.

Memory management is what bank-switching is all about. 'Management' implies making effective use of resources. Changing banks without some clear purpose is like trying to cook spaghetti in outer space - you'll never trace it all.

Although you can reconfigure memory any way you choose (and the MCR is only one way of doing it), a certain standard approach is suggested by the way BASIC organizes its resources. Adherance to that "standard" provides a strategy that will help you avoid bogging down in the 128's quicksand interior.

'Common' RAM ($0002-$03FF) is the key to communicating (and commuting) between banks. Before you try using it, let's confront the simpler task of reaching beyond the relatively safe "System RAM" that Bank 15 provides.

In principal, Bank 15 has much in common with 64 Mode, making it a logical base for initial program development. True, the ROMs have encroached alarmingly, leaving only 16K of RAM. That RAM is not 'free' - you have to compete with BASIC and the Kernal to use it. However, we are veterans of the 64 Campaign and similar techniques apply.

If you've ever 'flipped out' the BASIC ROM to retrieve data from 'underneath', or plugged in a cartridge to replace BASIC altogether, then you've already practised bank-switching.

These 64 Mode resources may be re-arranged to a certain extent by using the three Memory Control bits at $0001. In 128 Mode the Memory Control Register at $FF00 provides enhanced though similar facilities. Altering individual bits may require several steps, whereas storing a byte sometimes takes only one. It is therefore often easier to "change banks"

Table 1 - C-128 Bank Configurations, Methods of Access

BANK#	CFG	LCR*	Components	Remarks
15	$00	$FF00*	RAM-0,Kernal & BASIC ROM, I/O	System's "Home" Bank
(14A)**	$41	$FF04	RAM-1,Kernal & BASIC ROM,CHR-ROM	Data Processing
14	$01	$FF03	RAM-0, Kernal & BASIC ROM,CHR-ROM	Internal Operations
1	$7F	SFF02	RAM-1 only	Data Storage
0	$3F	SFF01	RAM-0 only	Program Bank

*Note (1): There is no LCR for Bank-15. To select, store ZERO in MCR ($FF00).
**Note (2): As there is no official Bank-14A, this number will not select it.

rather than "flip" individual chips in and out of a current configuration.

If you want to read the RAM 'under' Bank 15's ROM, for example, switch to Bank 0. Then, no matter how big the files get, your program will be able to read them all. If you call ROM routines from a loop that stores output in Bank 0, why not put it in Bank 14? That way the ROM and RAM you need is already there without constantly switching between them. (You don't even have to dodge the I/O chip registers).

For I/O operations (including most video), you must switch to Bank 15. The Kernal, except when servicing interrupts, always assumes it is in its "Home" environment. BASIC routines, on the other hand, will select Bank 15 whenever they need to use it.

In 64 Mode you would not think of executing code under the ROMs unless there was some advantage in doing so. If you had to use this area of memory, you would try to arrange things so it received data rather than operational code. Apply the same logic to 128 Mode. If your code needs more room to grow, consign data to Bank 1. Then all Bank 0 is free. Try to keep the overall organization as simple as possible and you'll save time and work in the end.

It should be obvious, though, that any code actually switching the MCR must be located in an area common to the banks it switches between. If you're using only Banks Zero, Fourteen and Fifteen, for example, anywhere below $4000 will do. (There's an unused area in the System Map below the GRAPHIC Screen if required).

What if the main program won't fit in the "System RAM" area? Provided the instructions doing the switching are locatd there, no problems need arise. Say for example one of your routines at $A600 in Bank 0 needs to use BASIC's GPLOT ($AF75). It can't directly JSR $AF75 - that would send it to $AF75 in Bank 0. It can't STA $FF03:JSR $AF75 - the JSR would 'vanish' before it could be executed.

However if you put the following ten bytes of code at $1BF0 (common to banks 0 and 14):

```
A 1BF0 STA $FF03
A 1BF3 JSR $AF75
A 1BF6 STA $FF01
A 1BF9 RTS
```

your code 'under the ROM' need only JSR $1BF0. The code at $1BF0-$1BF9 cannot switch itself out because it is present in both configurations it selects. Before returning to $A603 - the address following the instruction that called it - this bank-switching subroutine reconfigures its "home bank" in order to hand control back to the part of the program that called it.

Try it out. The Machine Language Monitor defaults to Bank 0. Use it to install the above code. Don't forget the 'JSR $1BF0' at $A600 and an RTS at $A603. Then 'X' to BASIC and see it actually happen. (You'll need the 40-column screen):

```
BANK0:GRAPHIC4,1:LOCATE80,99:PO
KE131,1
(sets up favourable conditions)
SYS DEC("A600")
```

A tiny dot should appear in the centre of your screen. SCNCLR and BANK15 to try again for a less fulfilling response (a chronic "Syntax Error"). How about that? You've got a choice of two different programs, both installed at the same address.

Referring to Table 2, the simplest way to understand large C128 program is to imagine it belongs to a single "Home" bank. Its bank-switching subroutines, like the example above, are confined to areas shared with the banks they access. Subroutines not visible to code in a program's home bank are accessed via those bank-switching routines. These "indirect" routines will invoke the bank they are visiting, and restore the home bank for return.

It is easy to extend this logic to switching between any two banks. All it requires is use of the RAM below $0400 which is common to all. That is the purpose of the Kernal's general-purpose bank-switching routines (and BASIC's more specialized ones).

Having come this far, you should have no trouble figuring out how "Kernal Indirect" routines work. Don't forget though, Kernal ROM must be in context before you can use them.

If that seems like an obstacle, remember all you need is a zero for the MCR. Then, provided your bank-switching instructions are located in a common area, the System Bank, with all its resources, will materialize around them.

Before I depart for Bank 99, I'll leave you with this little "teaser": Next time you're working with your 128, before you go to lunch, issue the following command(s):

```
DO:PRINT PEEK(7);:LOOP
```

When you return, your computer should still be chugging away. (You can stop it now).

Later, before you go for your coffee break, SAVE anything you'd hate to lose, and re-issue the same instructions. But not until after you've nominated one of those foreign banks:

```
SIBERIA=6
BANK SIBERIA
DO:PRINT PEEK(7);:LOOP
```

The computer will do as you tell it, the same as last time. But odds are, by the time you've returned, it will have stopped, and may not respond to RUN/STOP<RESTORE>.

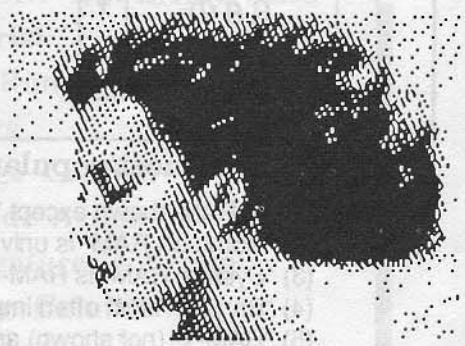
If you can figure out:

(a) Why the computer crashed, and

(b) Why it worked for so long,

you can be assured that bank-switching will cause you few further problems.

(Table 2 is on next page, page 48)



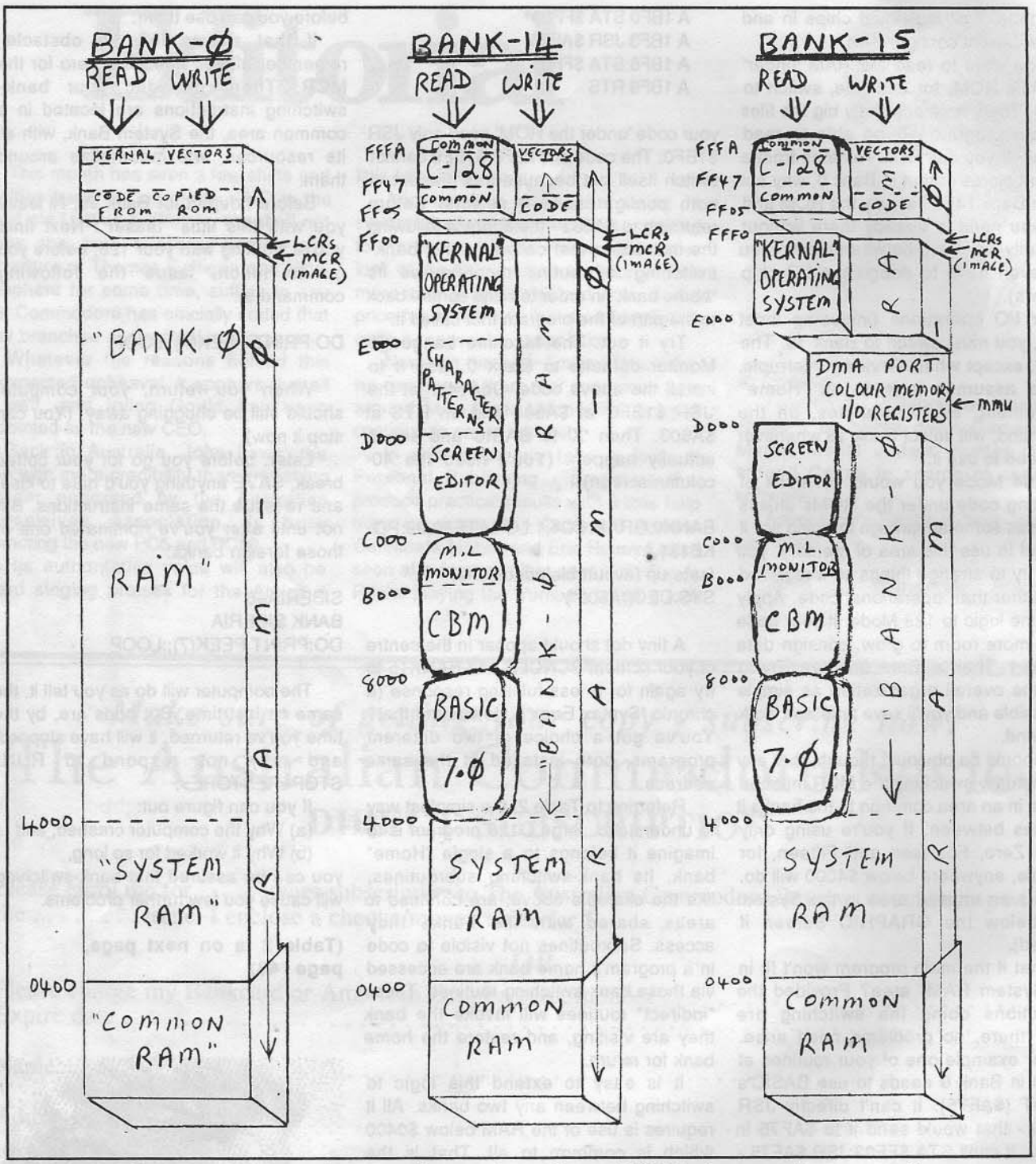


Table 2: Three most popular configurations from 128-Mode users' perspective

Notes
(1) All RAM shown except 'Colour Memory' is designated RAM-0
(2) "Common RAM" is universal to all configurations
(3) "System RAM" is RAM-0 readable in Banks 14 & 15.
(4) "Bank-0 RAM" often implies RAM-0 not readable in Banks 14 & 15 - Bank 0 is selected to read it.
(5) "RAM-1" (not shown) appears in place of RAM-0 in Banks 1 & 14A.
(6) VIC-II (video) access to memory is independent of these configurations.

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